SECTION 3

MECHANICAL ADJUSTMENT

CONTENTS

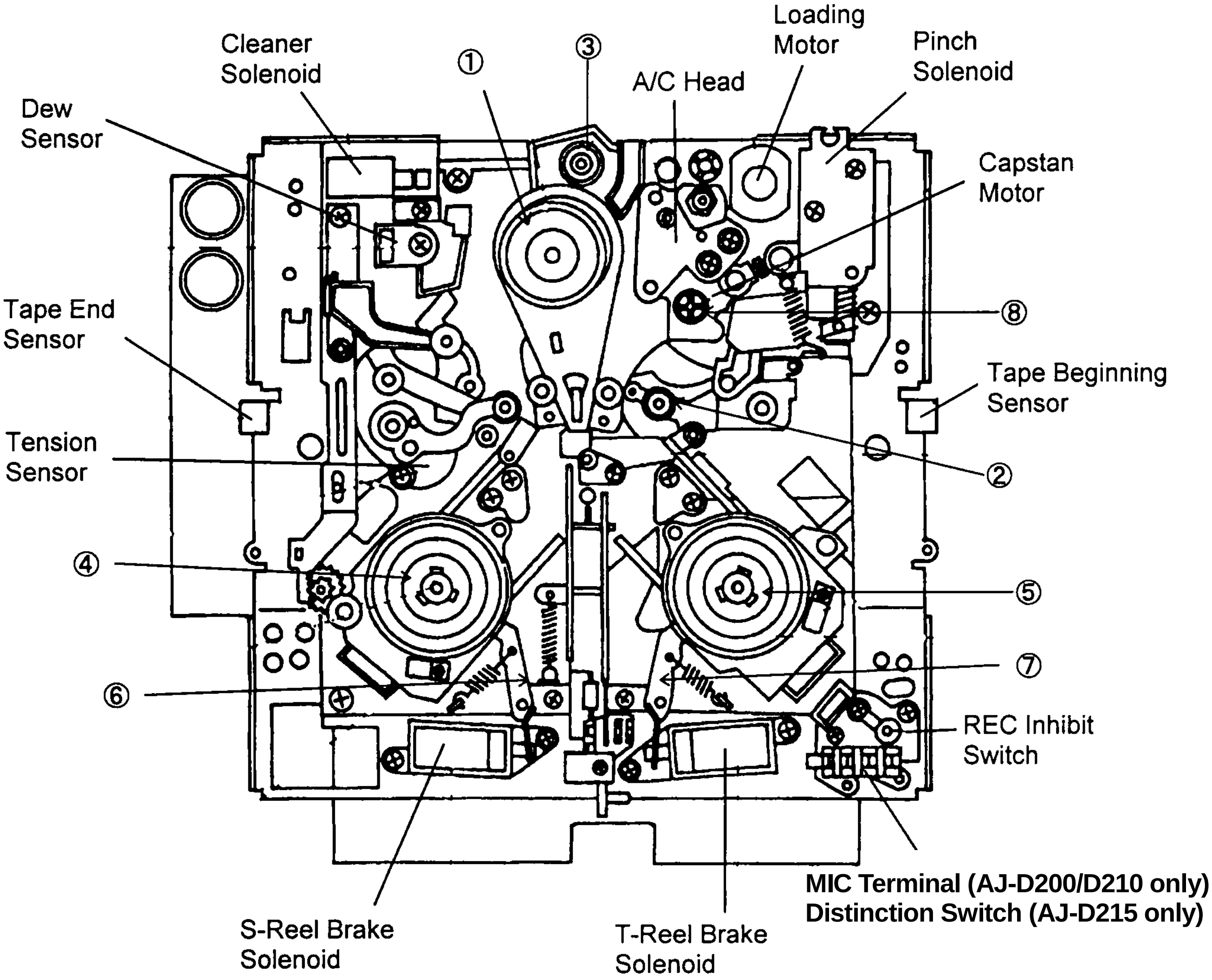
Mechanical/Servo Adjustment 3-2
Name of tape transportation 3-2
TP & VR location 3-3
1. Pinch Solenoid Adjustment 3-4
2. Main Brake Torque Confirmation 3-4
3. Post Height Preadjustment 3-5
4. Reel Torque Adjustment 3-5
Tension Adjustment Flowchart 3-6
5. Tension Offset Adjustment 3-6
6. Neutral Position Adjustment 3-7
7. Play & Rev Tension Adjustment 3-7
8. Tension Spring Adjustment 3-8
9. REV Tension Confirmation 3-8
Tape path Adj. Flowchart 3-9
Post Limit Confirmation Flowchart 3-9
10. T3 Post Height Adjustment 3-9
11. Linearity Preadjustment- 3-10
12. A/C Head Height Adjustment 3-10
13. A/C Head Azimuth Adjustment 3-11
14. Post Limit Confirmation 1 3-11
15. Envelope Confirmation 1 3-12
16. Envelope Confirmation 2 3-12
17. Tension Height Adjustment 3-13
18. Post Limit Confirmation 2 3-13
19. A/C Head Tilt Adjustment 3-14
20. Post Limit Confirmation 3 3-14
21. PG Shifter Adjustment 3-15
A/C Head Adj. Flowchart 3-15
22. A/C Head Tilt Confirmation 3-16
23. A/C Head Confirmation 3-17
24. A/C Head Azimuth Confirmation 3-18
25. X Value Adjustment 3-19
Linearity Adjustment Flowchart 3-20
26. LISTA Connection 3-20
27. LISTA Sensitivity Adjustment 3-21
28. LISTA Sensitivity Detection 3-21
29. LISTA Linearity Adjustment 3-22
30. LISTA Waving Measurement 3-22
31. Linearity Confirmation 3-23

Maintenance Schedule

No.	Name	Part Number	Using Hours					
			2,000	4,000	6,000	8,000	10,000	12,000
-	Tape Path Cleaning	- - -	Δ Clean the Tape Path at each 500 hours					
1	Cylinder Unit	VEG1499	●	●	●	●	●	◎
2	Pinch Arm Unit	VXL2835		●■		●■		◎
3	Cleaning Arm Unit	VXL2924	●	●	●	●	●	◎
4	S Reel(Rotor Unit)	VEM0658			●			◎
5	T Reel(Rotor Unit)	VEM0659			●			◎
6	S Brake Arm	VXL2755			●			◎
7	T Brake Arm	VXL2756			●			◎
8	Thrust Screw Unit	VXQ 0556			●⮝			◎
-	Mech. Chassis Unit	VXY1433						●
-	1.5” CRT(EVF)	M04KYS07WB	● 5,000 hours by the operation time					

Note: Using Hours are based on the Drum Rotation hours.
Using hours are recommendation. It may depend on temperature, humidity or dusty.
Using hours are listed as the reference of maintenance. They do not mean guarantee hours.
◎ : These parts included in Mech. Chassis Unit, Replacing Mech. Chassis Unit is recommended.
■ : The lubrication is necessary when replacing the Pinch Arm Unit.
Δ : This mark means cleaning is necessary.
⮝ : The lubrication is necessary when replacing the Thrust Screw Unit.

Parts Location

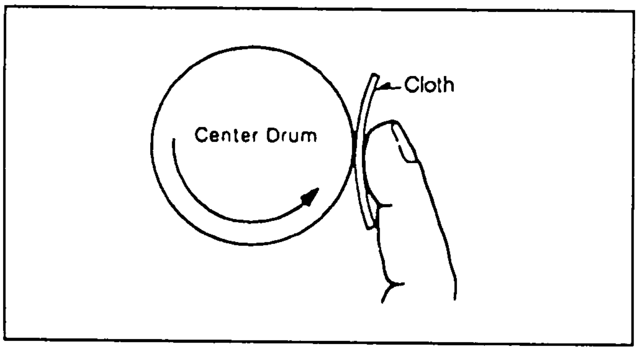


Cleaning Procedures

Make sure the power is OFF before cleaning.
Use ethanol (more than 99%) as cleaning liquid.

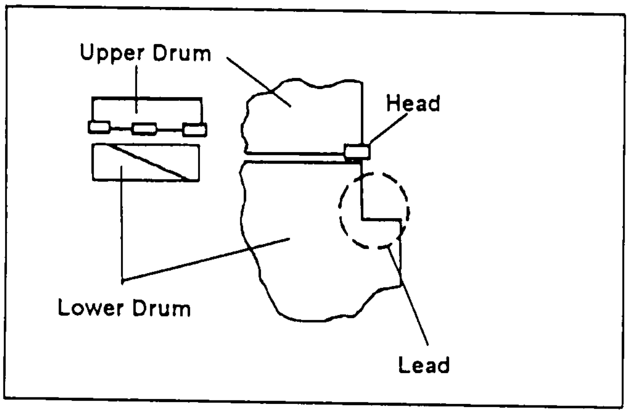
1. Cleaning of Head Chips (Daily)

Clean heads by applying even pressure and rotating cylinder a few times. Never wipe in up and down motion.
Never touch a cylinder by naked hand. First wipe with a cloth soaked by cleaning liquid. Then wipe with dry cloth.



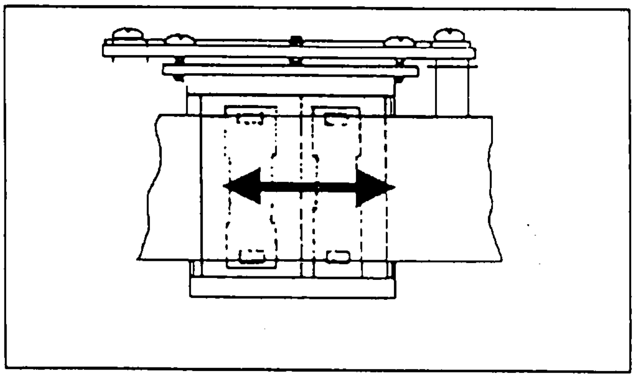
2. Cleaning of Drum Lead (Weekly)

Be careful not touch a head chip. Clean the Drum Lead with a pick



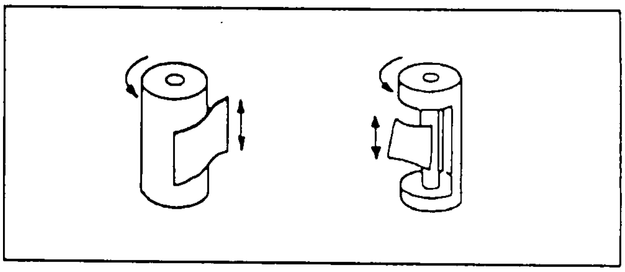
3. Cleaning of A/C Head (Weekly)

Wipe the A/C Head with a cloth soaked by cleaning liquid.
Wipe again with a dry cloth.



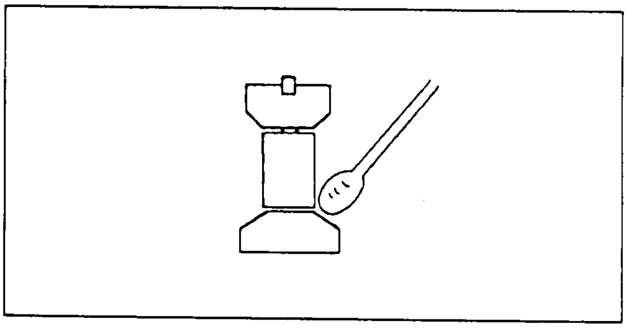
4. Cleaning of Pinch Roller and Capstan (Weekly)

Wipe the Pinch Roller and Capstan with a cloth soaked by cleaning liquid.



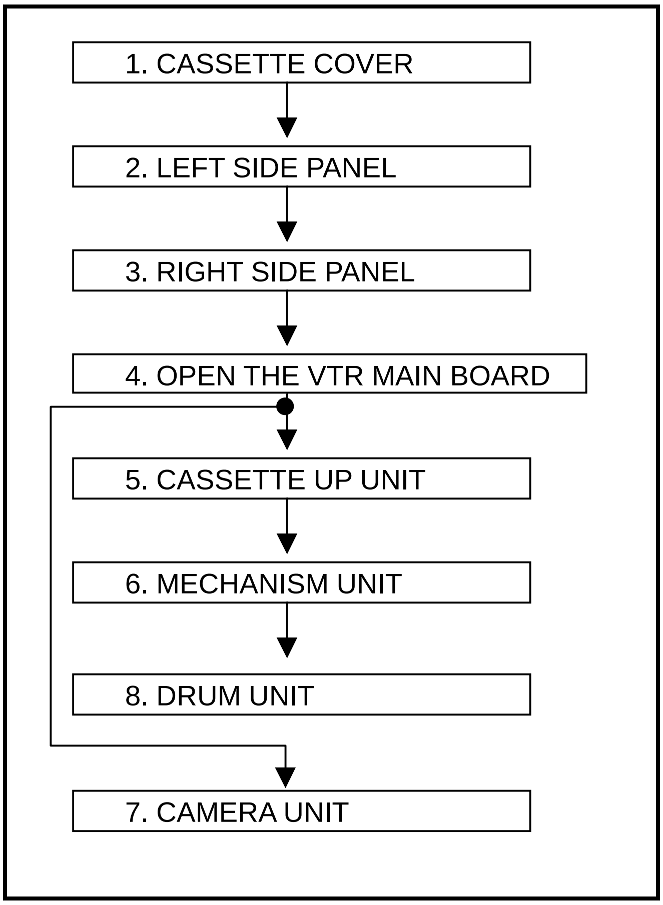
5. Cleaning of Post (Weekly)

Wind a cloth on a pick. Wipe each post dry with that pick .
Wipe again with a dry cloth. For metal posts wipe with cleaning liquid. Then wipe dry again.



DISASSEMBLY PROCEDURE

This flow chart indicates the disassembly steps the cabinet pares, P.C. Boards and Mechanism Unit in order to access to items to be serviced. When reinstalling, perform the steps in the reverse order.



DISASSEMBLY METHOD

1. Removal of Cassette Cover

Loosen the 2 screws (A) and slide the cover upward then remove it.

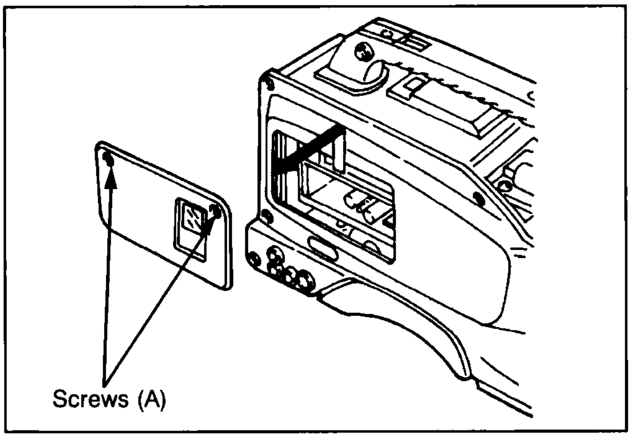


Figure 1-1

2. Removal of Left Side Panel

After removing the cassette cover, loosen the 7 screws (B) and remove the panel.

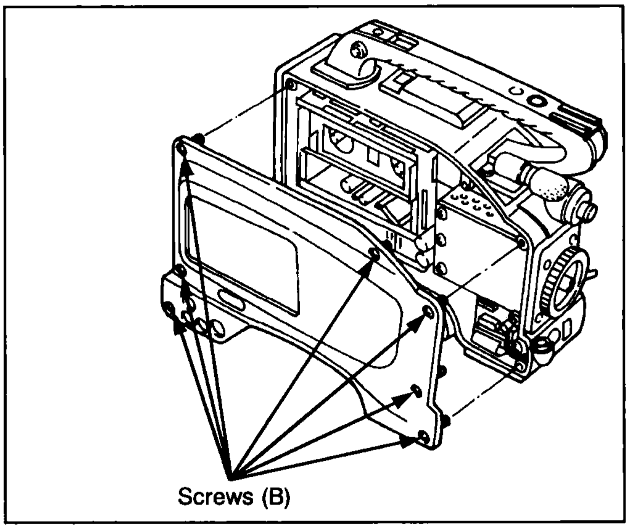


Figure 1-2

3. Removal of Right Side Panel

Loosen the 7 screws (C) carefully disconnect the P10 connector on the VTR Main C.B.A.

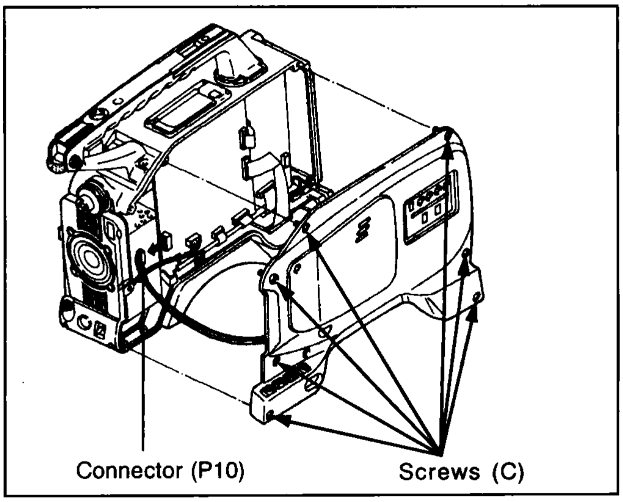


Figure 1-3

4. Open the VTR Main & Power C.B.A.

After removing the right side panel, unscrew the 2 screws (D), 1 screw (E) on the VTR Main board and 3 screws (F) 1 screws (G) on the Power board, then lay down the boards.

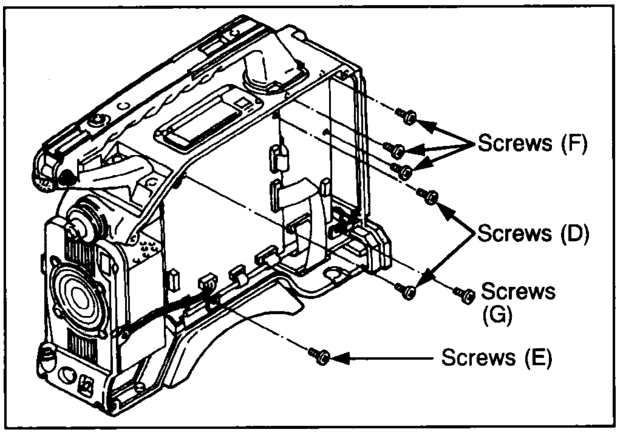


Figure 1-4

5. Removal of Cassette Up Unit

After removing the left side panel, unscrew the 4 screws (H) and remove it.

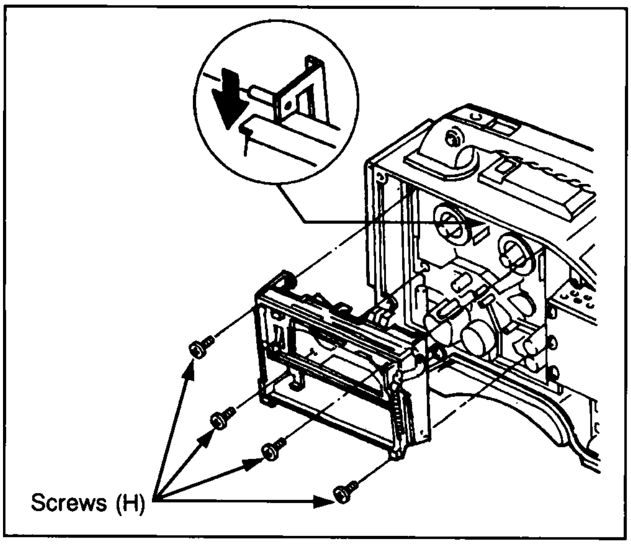


Figure 1-5

6. Removal of Mechanism Unit and Servo C.B.A.

After removing the loth side panel, disconnect the P3001 felxible cable on the VTR Main board.

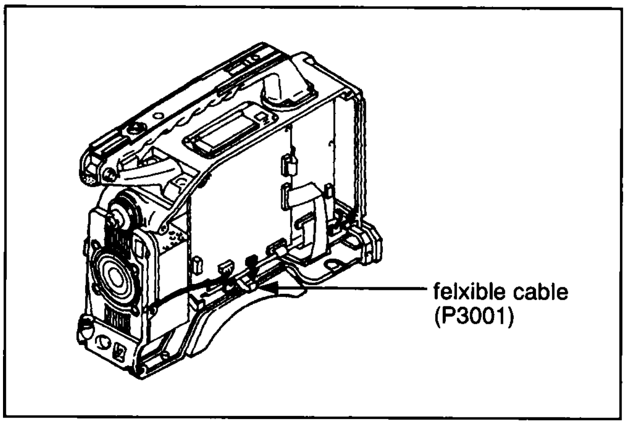


Figure 1-6

Open the board, Disconnect the P2615 connector and P2619 felxible on cable on the VTR Main board.

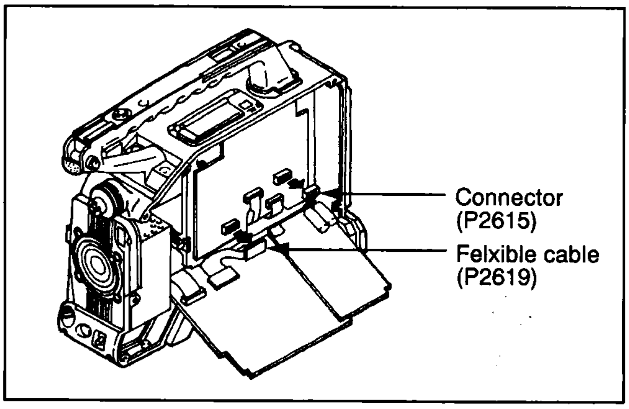


Figure 1-7

Unscrew the 2 screws (J) and slightly pull the AV Out unit then disconnect the P1005 on the Real Jack board.

Unscrew the 3 screws (K), remove the mechanism chassis and the Screw board with care not to scratch the connectors and cables.

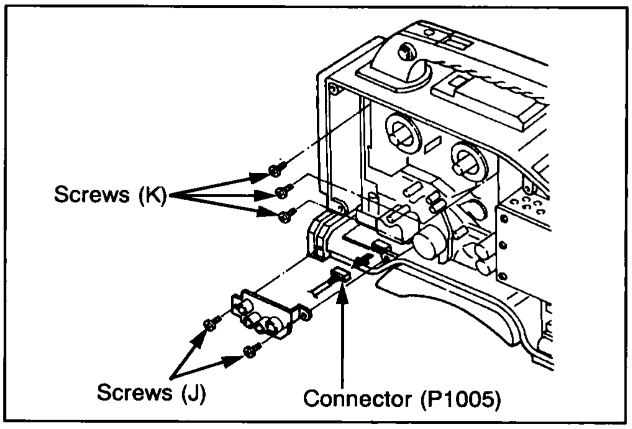


Figure 1-8

7. Removal of Camera Unit

After removing the both panels, disconnect the P6601, P6602 felxible cables and the P6605 connector.

Unscrew the a screw (L) on the test connector board.

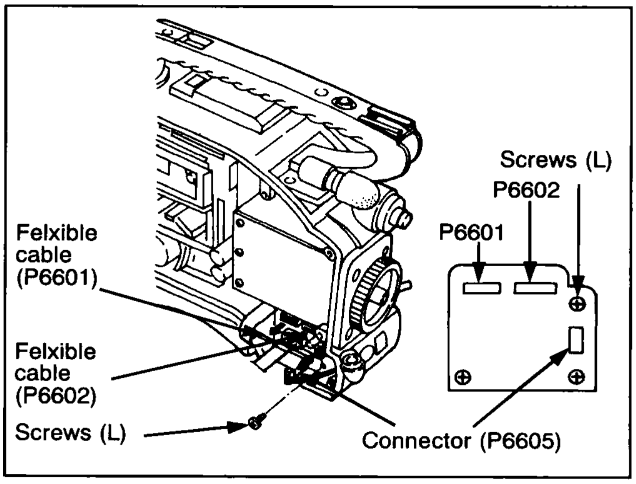


Figure 1-9

Disconnect the P7 connector and the P1 felxible cable on the VTR Main board.

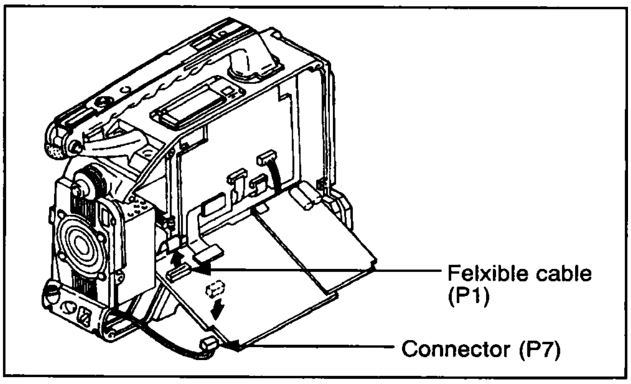


Figure 1-10

Unscrew the 4 screws (M) and pull out the camera unit.

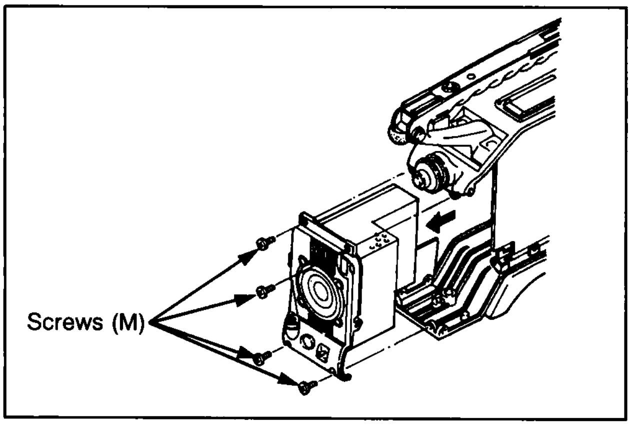


Figure 1-11

8. Removal of Drum Unit

After removing the mechanism unit, disconnect the P613 felxible cable.
Hold the top of the drum unit and unscrew the 3 screw (N).

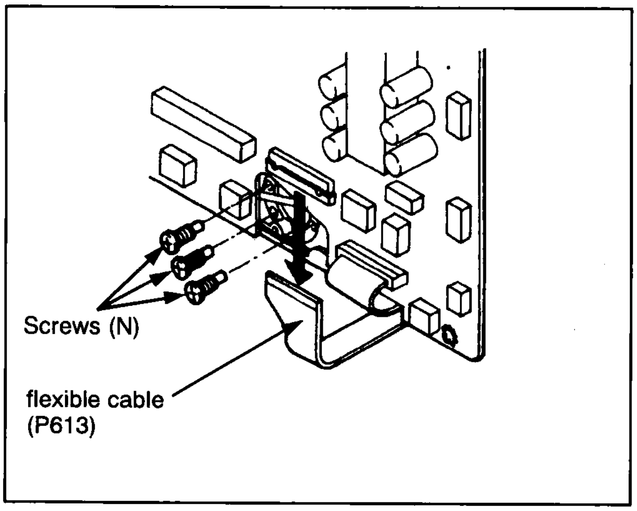


Figure 1-12

Remove the drum unit with care not to scratch the cables.

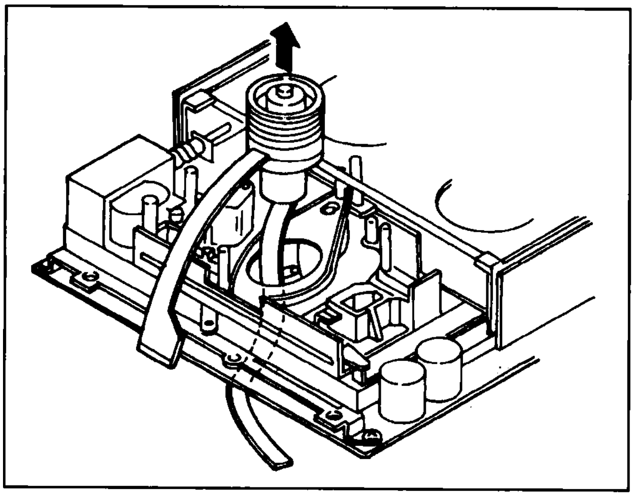


Figure 1-13

9. Emergency Eject

If the cassette tape cannot be ejected with pressing EJECT button or the cassette tape may be damaged by ejecting it, the cassette tape should be ejected out by the following steps.

1. Turn the power off.
2. Open the rubber cap above the GEN LOCK IN connector. Push in and rotate the red screw counterclockwise.
3. The tape is unloaded with click.
4. Continue until the cassette tape is ejected.

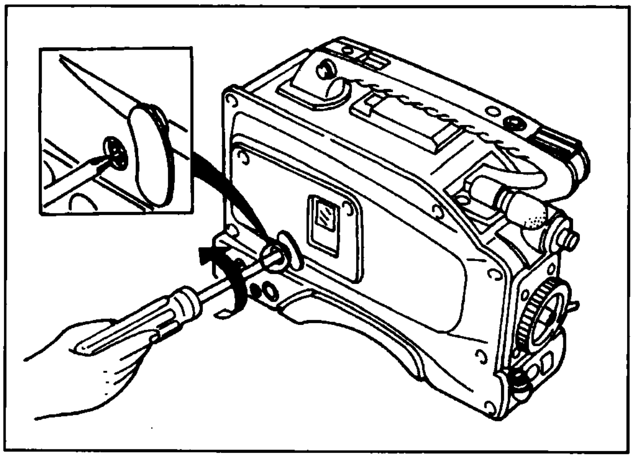


Figure 1-14

Mechanical Parts Replacement and Adjustment Procedures

General

When mechanical parts are replaced, pay attention to the following notes.

1. Turn power off before replacing any part.
2. If any adjustment is required after replacing parts. perform the required adjustments.
3. Use proper fixture tools.
4. Make sure to clean the parts after replacement.

Also when the mechanical parts are replaced, follow the replacement procedure.

1. Drum Unit Replacement

(Removal of Mechanism Unit)

Refer to the "Section 2. Disassembly procedures" Item 1 to 6 and remove the Mechanism Unit and the Servo C.B.A.

(Removal of Cylinder Unit)

1. Remove the T1 Guide and Cleaning Arm Unit (Refer to item 12).
2. Disconnect P3001, P613 on the Servo C.B.A. and hold the top of the Drum Unit then remove 3 screws and carefully pull out the Drum Unit with care not to scratch the flexible cables.

Note: Be careful when removing the flexible cable from the connector. Refer to the way to remove the connector as shown in Figure M1.

Note: Never touch the cylinder with a finger directly when pulling out the Drum unit.

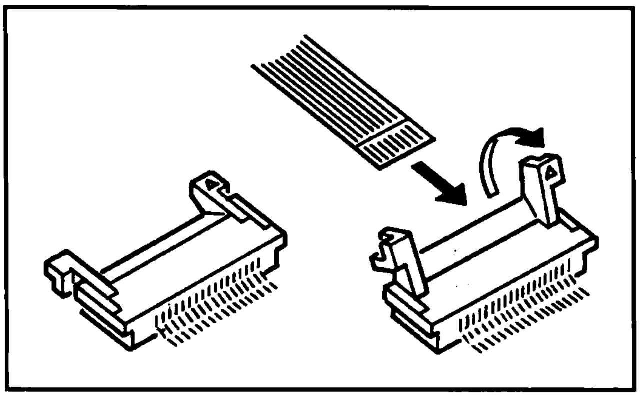


Fig. M1

(Installation)

1. Install the new Drum Unit according to the opposite procedures to removing.
2. After installing T1 Guide, T1 Guide position adjustment should be performed (Refer to item 12-1).

Note: When installing the Drum Unit, the pin on Mech. Chassis should match hole of Drum Unit as shown in Figure M2.

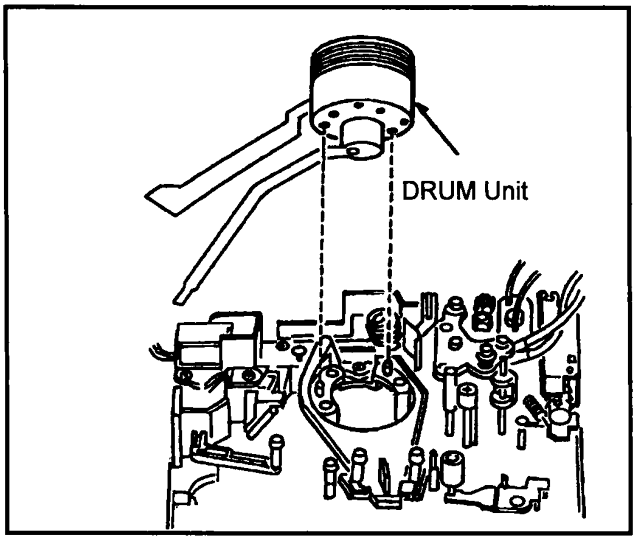


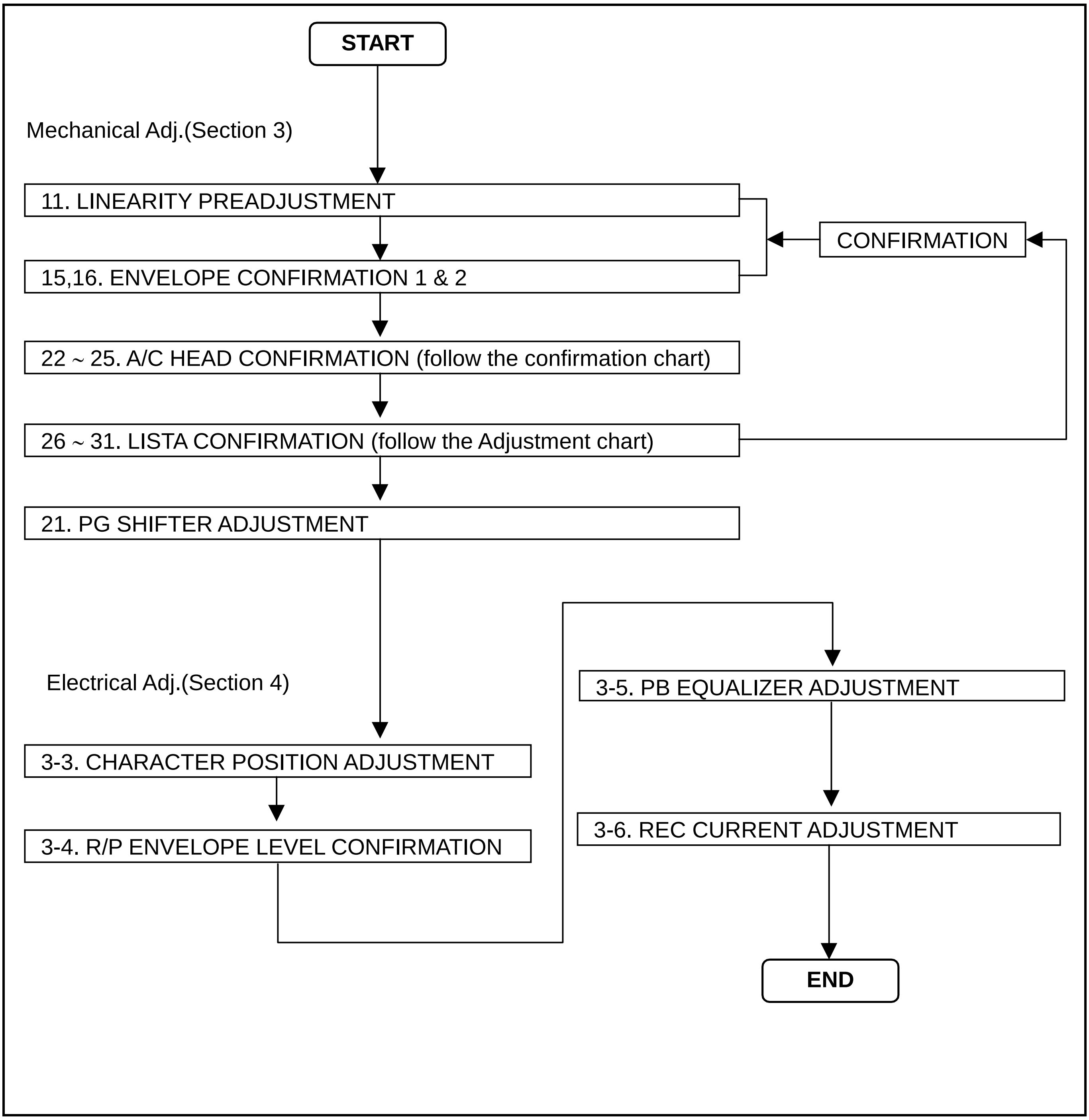
Fig. M2

1-1. Adjustment Flow Chart After Drum Unit Replacement

1. After changing the Drum Unit, perform the following steps.

Adjustment Flowchart After Drum Unit & Mech. Chassis Replacement

Note: Confirm the tape path linearity before head replacement.
The number indicated on the chart below is item number on the Service Manual.


START
Mechanical Adj.(Section 3)
11. LINEARITY PREADJUSTMENT
CONFIRMATION
15,16. ENVELOPE CONFIRMATION 1 & 2
22 ~ 25. A/C HEAD CONFIRMATION (follow the confirmation chart)
26 ~ 31. LISTA CONFIRMATION (follow the Adjustment chart)
21. PG SHIFTER ADJUSTMENT
Electrical Adj.(Section 4)
3-3. CHARACTER POSITION ADJUSTMENT
3-4. R/P ENVELOPE LEVEL CONFIRMATION
3-5. PB EQUALIZER ADJUSTMENT
3-6. REC CURRENT ADJUSTMENT
END

2. A/C Head Replacement

2-1. Replacement

* Required tools:
Nut Driver (5.5m/m)(VFK1150)
Hex Driver (VFK1148)
Hex Wrench (VFK1190)

(Removal)

1. Remove the Cassette Cover, Left Side Panel and the Cassette Up Unit.
2. Loosen the hex. screw (B) and remove the Nut (C). Pick up the Head Height Adjustment Spring and then remove the A/C Head Unit as shown in Figure M5.

Point: Memorize the height of Nut (C) before removing the Nut (C).

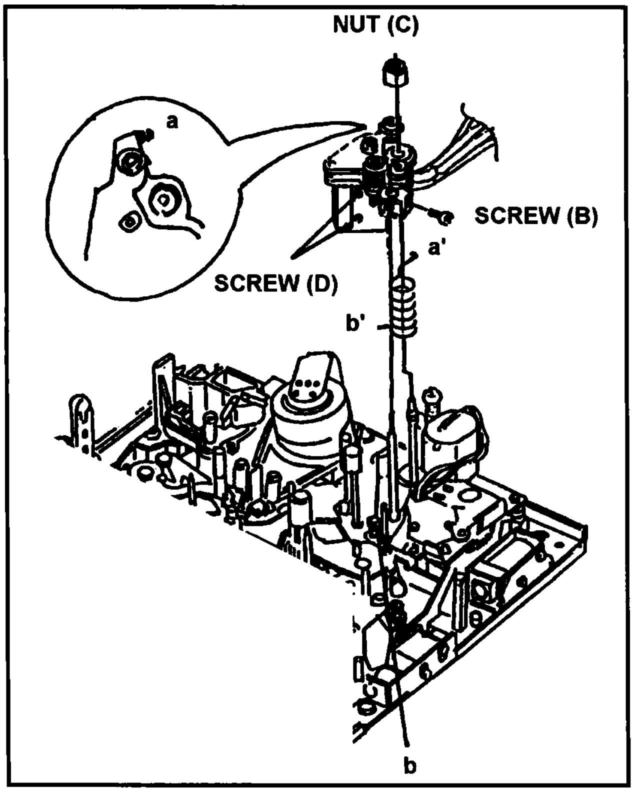


Fig. M5

4. Remove the 2 screws (A). Disconnect the connector P1005 on the Rear Jack C.B.A. and P600 on the Servo C.B.A. and then remove the A/C Head from the A/C Head Plate.

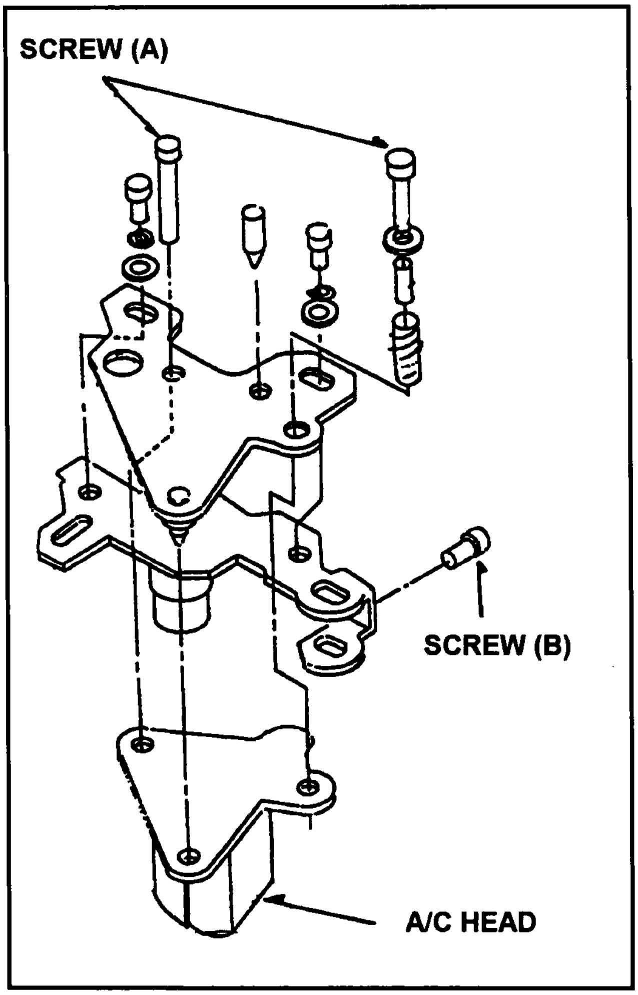


Fig. M6

5. Remove 2 screws (D) to remove the Shield Cover as shown in Figure M5.
6. Unsolder the lead wires one by one. (Don't unsolder all wires at the same time.)

(Installation)

1. Remove the Shield Case from the New A/C Head and solder the lead wires to New A/C Head (Refer to Figure M7).
2. Re-install the shield case to A/C Head.
3. Install the A/C Head to A/C Head Plate and tighten 2 screws (A) so that A/C Head is parallel to A/C Head Plate.
4. Install the A/C Head Unit.
5. Put on the Head Height Adjustment Spring and tighten the Nut (C).
6. Clean the surface of the A/C Head.

Note: After installing, Mechanical and Electrical Adjustments should be performed.
The hex screw (B) is kept loose until the A/C Head Height Adjustment is completed.

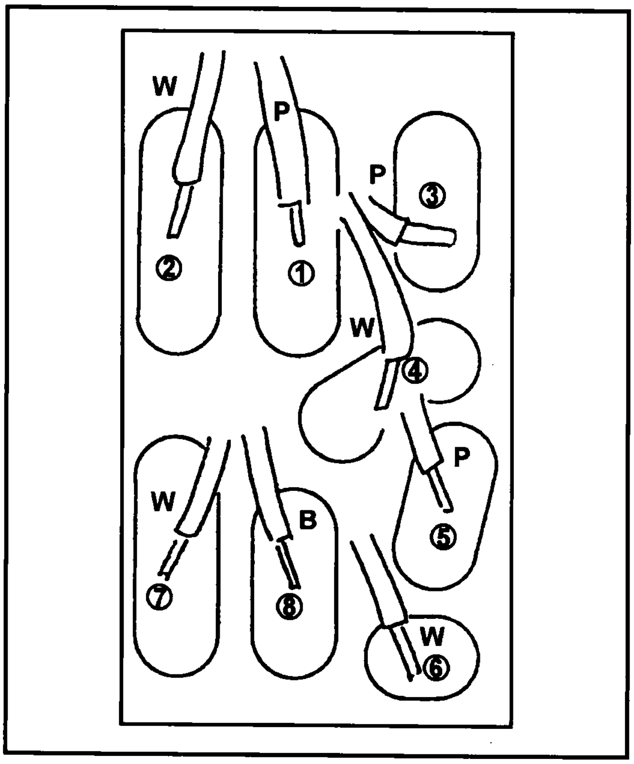
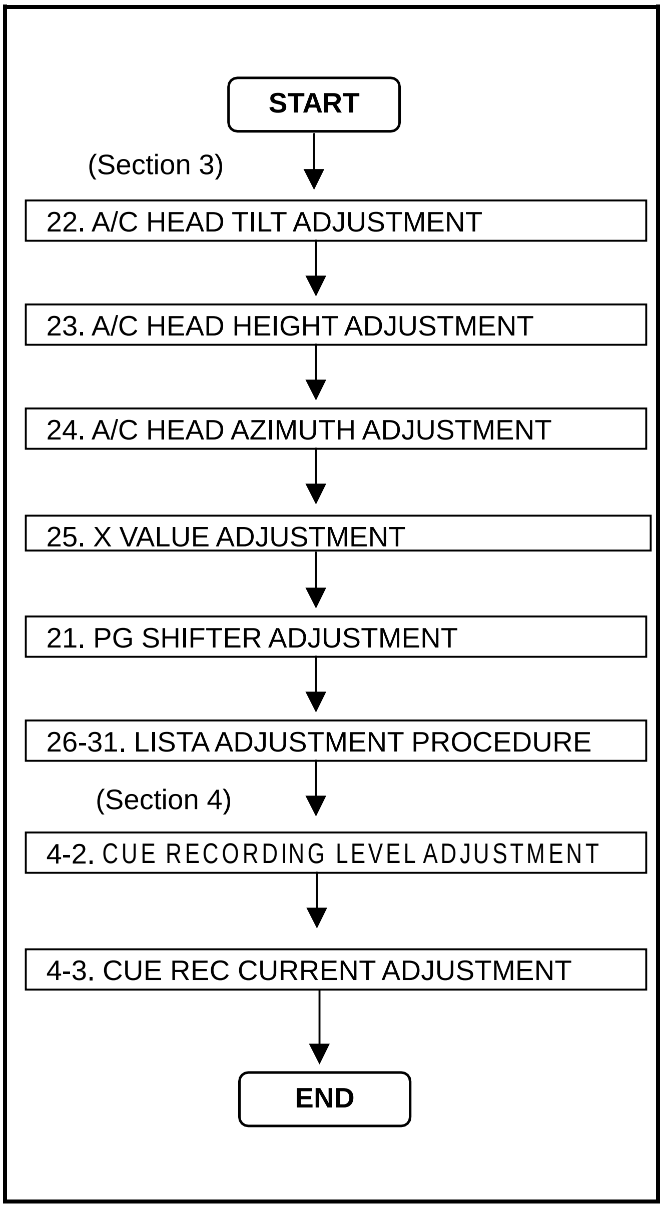


Fig.M7 Connection of A/C Head

A/C Head Side	Cable Color		Connector No.
1	PINK	YELLOW	P1005
2	WHITE		
3	PINK	RED	
4	WHITE		
5	PINK	GREEN	
6	WHITE		
7	WHITE	YELLOW	P600
8	BLACK		

2-2. Adjustment Flowchart After A/C Head Replacement

1. After replacing the A/C Head, perform the following steps.


START
(Section 3)
22. A/C HEAD TILT ADJUSTMENT
23. A/C HEAD HEIGHT ADJUSTMENT
24. A/C HEAD AZIMUTH ADJUSTMENT
25. X VALUE ADJUSTMENT
21. PG SHIFTER ADJUSTMENT
26-31. LISTA ADJUSTMENT PROCEDURE
(Section 4)
4-2. CUE RECORDING LEVEL ADJUSTMENT
4-3. CUE REC CURRENT ADJUSTMENT
END

3. Reel Table Replacement

3-1. Supply Reel Rotor Unit Replacement

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connector P614 on the Servo C.B.A.
3. Turn the Emergency Gear until S1 Post moved center loading position and remove the S5 Post (Refer to item 14).
4. Pull up the Arm Return Spring on the Connection Arm Angle Side and disconnect the Connection Arm Angle.
5. Unscrew the 2 screws (C) to remove the Supply Reel Stopper as shown in Figure M8.
6. Push the Reel Table to middle position and unscrew the 2 screws (D) to remove the Supply Reel Rotor Unit as shown in Figure M8.
7. Remove the 2 Cut Washers to remove the Idler Arm Unit.

3-2. Take Up Reel Rotor Unit Replacement

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connector P615 on the Servo C.B.A.
3. Unscrews the 2 screws (E) and then remove the Take Up Reel Stopper.
4. Push the Reel Table to middle position and unscrew the 2 screws (F) to remove the Take Up Reel Rotor Unit as shown in Figure M8.

CAUTION: Don't touch FG portion with the magnetized screw driver.

(Installation for both unit)

1. Install the new Reel Rotor Unit according to the opposite procedures to removing.
2. Adjust the "4 Reel Torque Adj." and confirm "2. Main Brake Torque" in the Section 3.

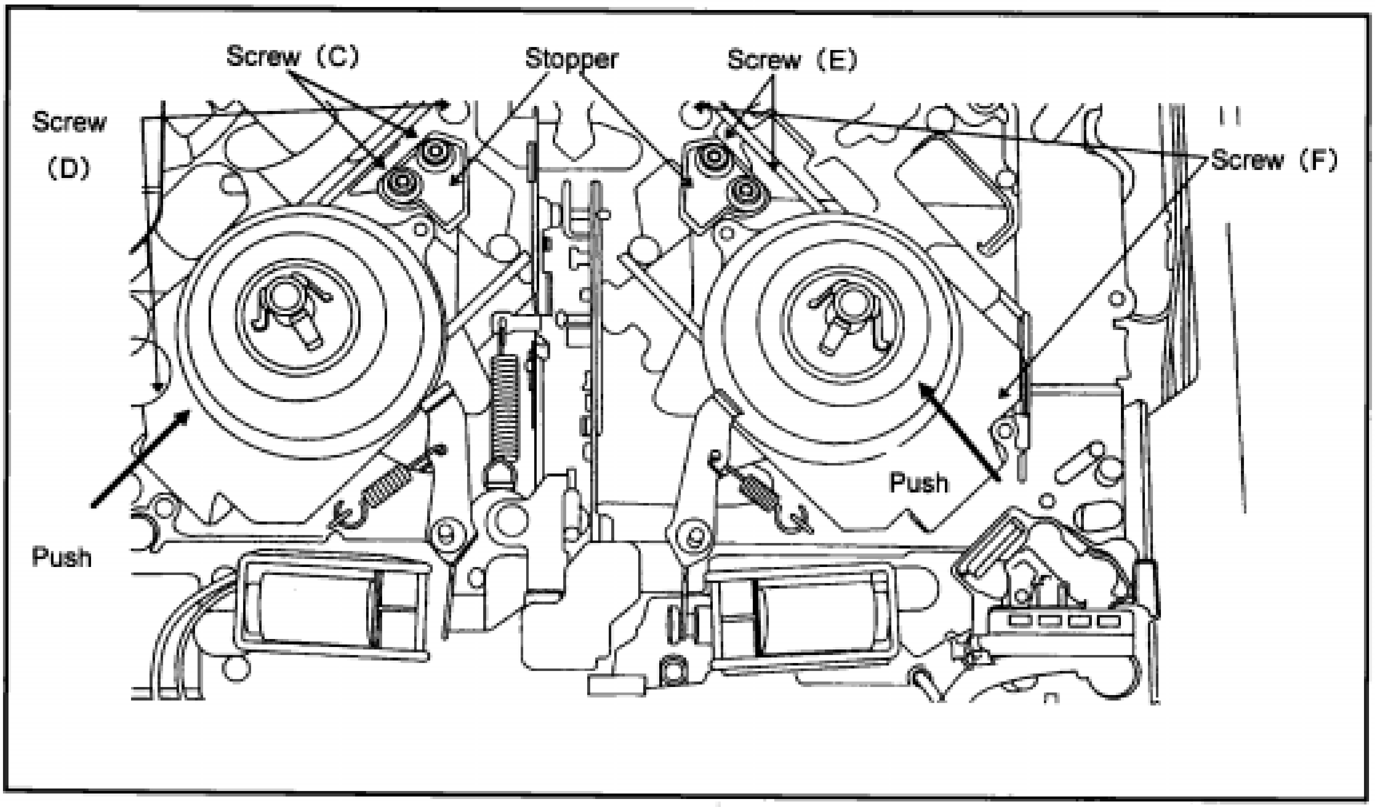


Fig. M8

4. Pinch Solenoid Replacement

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connector P610 on the Servo C.B.A.
3. Unscrew the 2 screws (A) and remove the Pinch Solenoid Unit as shown in Figure M9.
4. Unscrew the 2 screws (B) and remove the Pinch Solenoid Angle.
5. Unscrew the 2 screws (C) and remove the Pinch Solenoid from the Pinch Solenoid Base.

(Installation)

1. Install the new Pinch Solenoid according to the opposite procedures to removing.
2. After installing, Pinch Solenoid Position Adjustment is required. (Refer to "1. Pinch Solenoid Adj." in the Section 3).

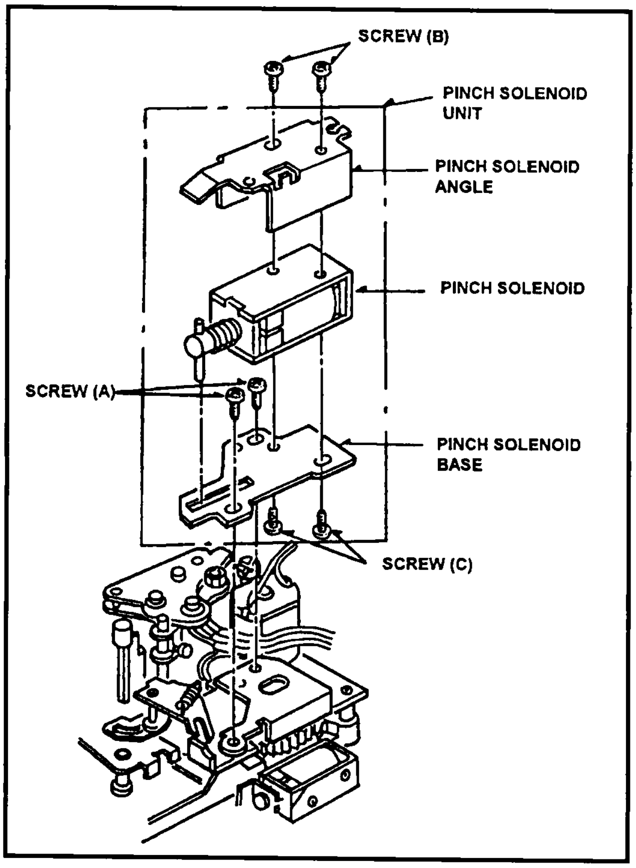


Fig. M9

5. Pinch Arm Unit Replacement

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Remove the Pinch Solenoid Unit (Refer to item 4).
3. Remove the Cut Washer (A) to remove the Pinch Solenoid Lever as shown in Figure M10.
4. Remove the Cut Washer (B) to remove the Pinch Arm Unit as shown in Figure M.10.

(Installation)

1. Install the new Pinch Arm Unit according to the opposite procedures to removing.
2. After installing, Pinch Solenoid Position Adjustment is required. (Refer to "1. Pinch Solenoid Adj." in the Section 3).

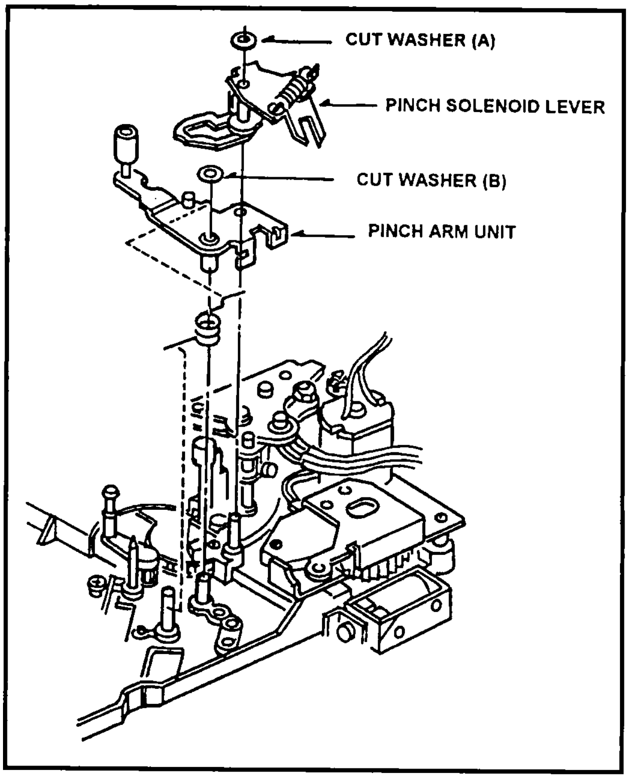


Fig. M10

6. Loading Motor Unit Replacement

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connector P611 on the Servo C.B.A.
3. Remove the Pinch Solenoid and Pinch Solenoid Lever.(Refer to item 4 & 5).
4. Unscrew the screw (B) to remove the Emergency Shaft as shown in Figure M11.
5. Unscrew the 2 screw (C) to remove the Loading Motor Unit as shown in Figure M11.
6. Unscrew the 2 screw (D) to remove the Loading Motor Neutral Unit as shown in Figure M11.

(Installation)

1. Install the new Loading Motor Unit according to the opposite procedures to removing.
2. Install the Pinch Solenoid Unit. After installing, Pinch Solenoid Position Adjustment is required. (Refer to "1. Pinch Solenoid Adj." in the Section 3).

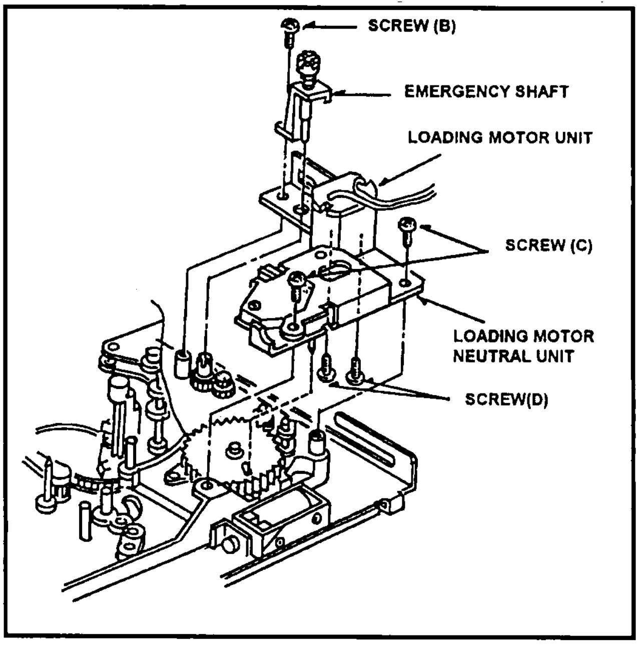


Fig. M11

7. Mode Select Switch Unit Replacement

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connector P612 on the Servo C.B.A.
3. Remove the Pinch Solenoid Unit and Loading Motor Neutral Unit (Refer to item 4 to 6).
4. Remove the screw (D) to remove the Mode Select Switch Unit from Loading Motor Neutral Unit as shown in Figure M12.

(Installation)

1. Install the New Mode Select Switch Unit according to the opposite procedures to removing.

Note: Confirm that the pin of Mode Switch Unit matches groove of Main Cam Gear.

2. After installing, Pinch Solenoid Position Adjustment is required. (Refer to "1. Pinch Solenoid Adj." in the Section 3).

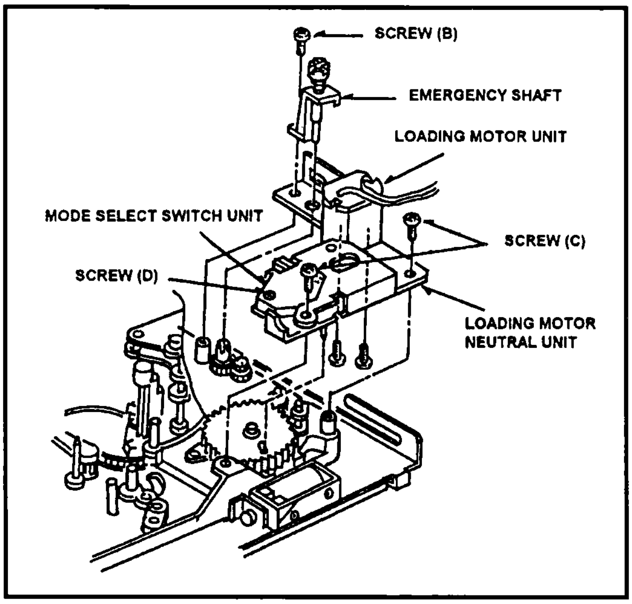


Fig. M12

8. Main Cam Gear Replacement

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Remove the Pinch Solenoid Unit and Loading Motor Neutral Unit (Refer to item 4 to 6).
3. Remove the Main Cam Gear as shown in Figure M13.

(Installation)

1. Install the Main Cam Gear so that the pin of Main Cam Arm Unit (*) matches the groove position of Main Cam Gear as shown in Figure M13.
2. Follow the opposite procedures to removing.
3. After installing, Pinch Solenoid Position Adjustment is required, (Refer to "1. Pinch Solenoid Adj." in the Section 3).

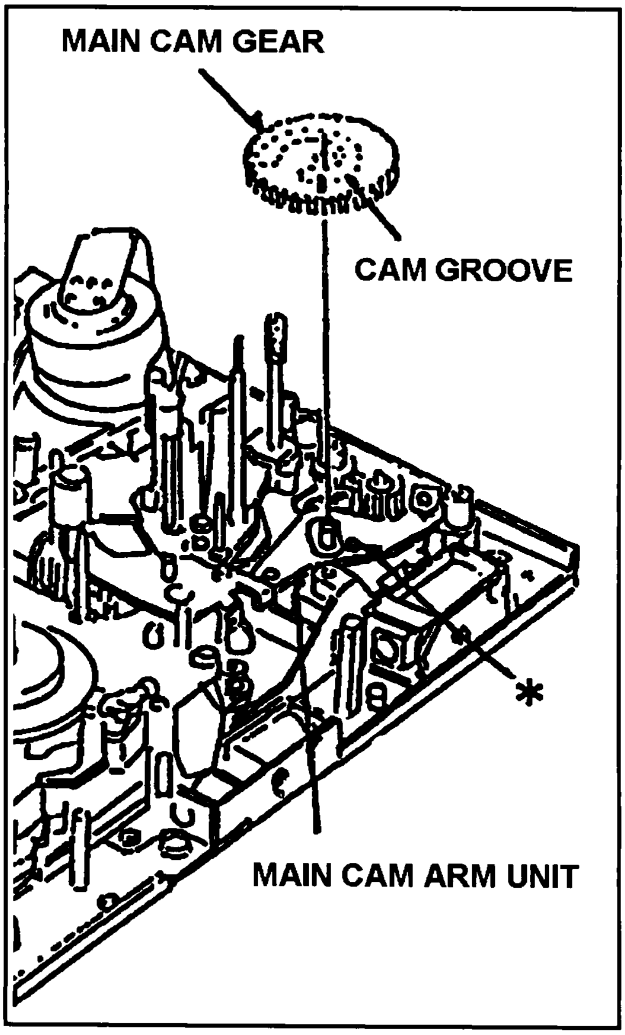


Fig. M13

9. Brake Arm & Brake Solenoid Replacement

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connectors P605, P608 on Servo C.B.A.
3. Unscrew the 2 screws (A) to remove the Supply Brake Solenoid and unscrew the screw (B) to remove the Solenoid base as shown in Figure M14.
4. Remove the cut washer (C) to remove the Supply Brake Arm.
5. Unscrew the 2 screws (D) to remove the Take Up Brake Solenoid and unscrew the screw (E) to remove the Solenoid base as shown in Figure M14.
6. Remove the cut washer (F) to remove the Take Up Arm.

(Installation)

1. Install the new cassette Brake Base Unit according to the opposite procedures to removing.

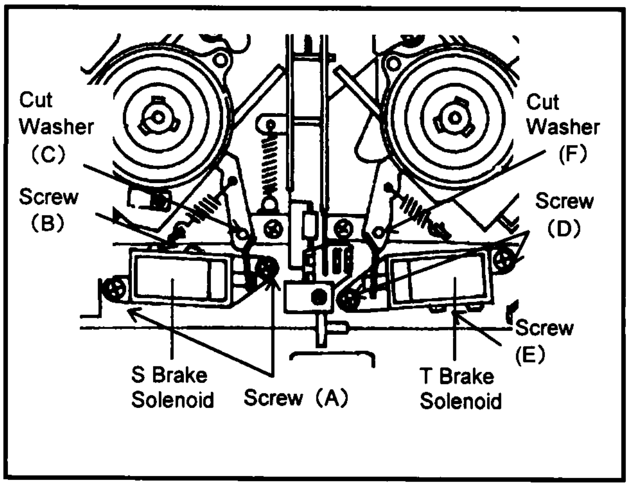


Fig. M14

2. After installing, the Brake Solenoid Position Adjustment required (Refer to item 16 in this section).

10. MIC Base Unit Replacement

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connector P607 on Servo C.B.A.
3. Unscrew the 2 screws (A) and remove the MIC Base Unit as shown in Figure M15.

(Installation)

1. Install the new MIC Base Unit according to the opposite procedures to removing.
2. Confirm that the M cassette touches to MIC Base Unit properly.

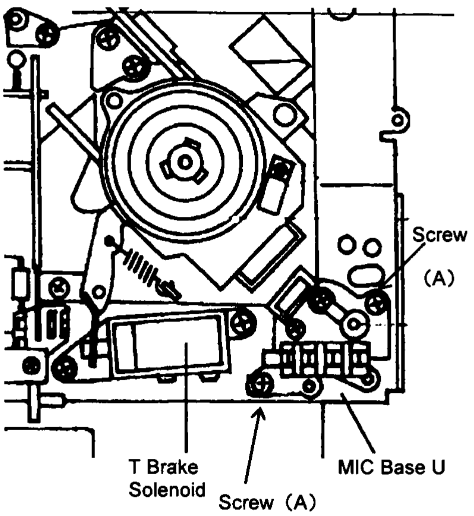


Fig. M15

11. S1 & T1 Post Loading Arm Unit Replacement and Adjustment

(Removal)

1. Remove the Cassette Cover, both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Remove the Mechanism Chassis Unit and the Drum Unit.
3. Remove the T1 Guide and the Cleaning Arm Unit.
4. Turn the Emergency Gear until middle loading position and unscrew the screw (D),(E) as shown in Figure M16.
5. Remove the S5 Stopper Base and the Tension Arm Unit (Refer to item 14 & 15).
6. Unscrew the screw (A) and remove S1 Post from the Loading Rail as shown in Figure M16.
7. Remove the Cut Washer (B) and remove the S1 Loading Arm Unit as shown in Figure M16.
8. Unscrew the screws (C), and remove the T1 Post from Loading Rail as shown in Figure M16.
9. Remove the T1 Boat Unit from T1 Loading Arm Unit as shown in Figure M16.

(Installation)

1. Install the new S1 or T1 Loading Arm Unit according to the opposite procedures to removing. Then S1 Post Loading Arm Unit Phase Adjustment should be performed.
2. After installing, confirm that the S1 and T1 Post moves smoothly on the Loading Rail.

(Adjustment)

1. Adjust S1 Post Loading Arm Unit so that the hole (A) should match hole (B) as shown in Figure M16.
2. When installing the T1 Boat Unit, the hole (A) should match hole (B) as shown in Figure M17.
3. Tension Arm, Post Height Pre-Adjustment and Linearity Adjustment (Refer to the Section 3) should be performed.

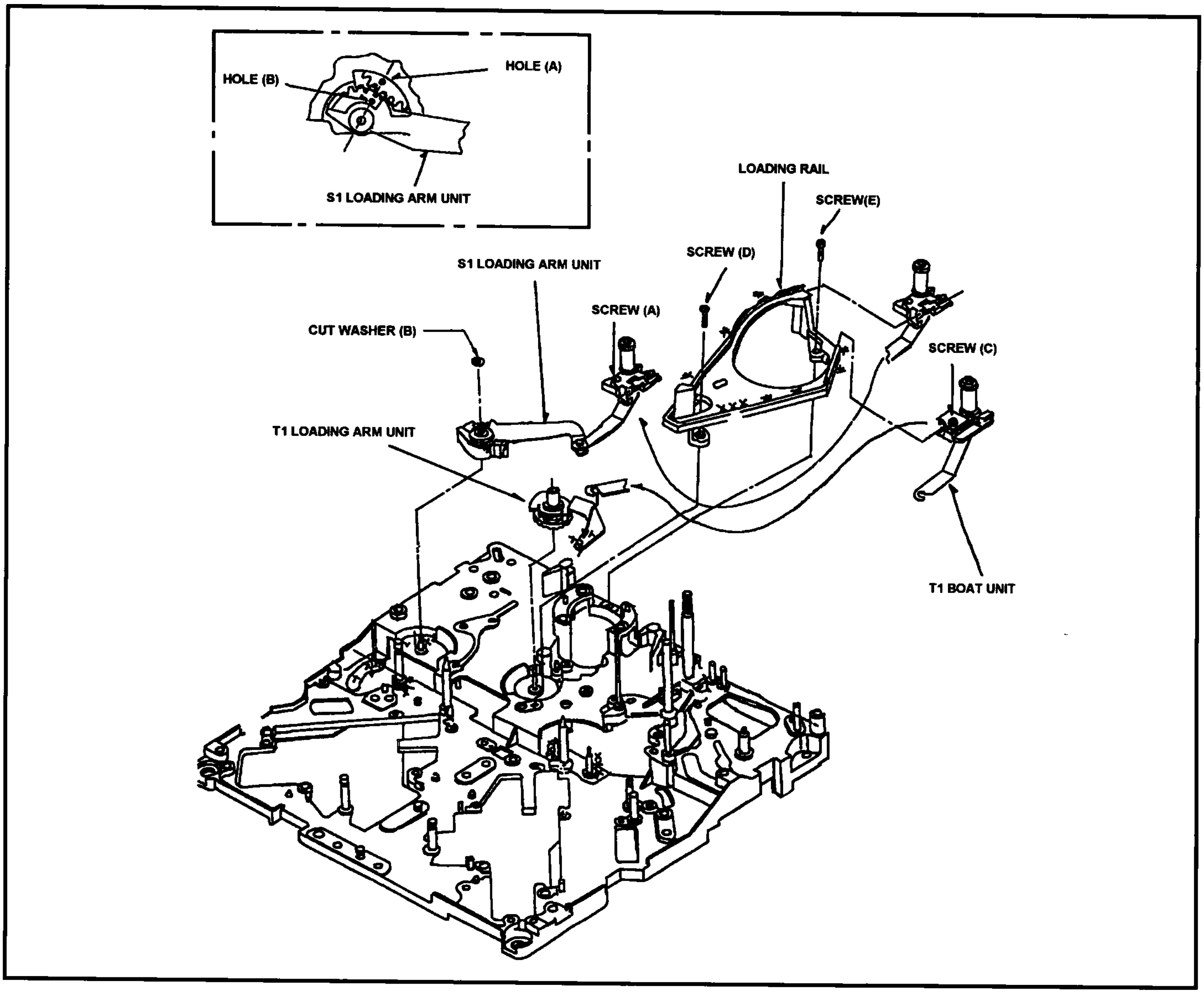


Fig. M16

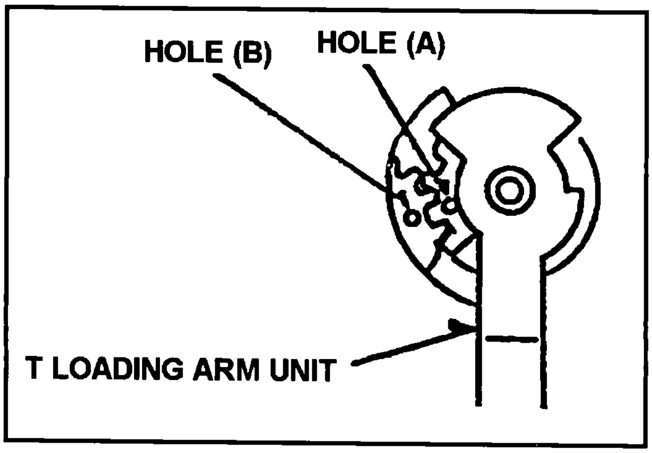


Fig. M17

12. Cleaning Arm Unit Replacement

(Removal)

1. Remove the Cassette Cover and Left Side Panel.
2. Unscrew the 2 screws (A) to remove the T1 Guide.
3. Pick up the tip portion (B) of Cleaning Arm Unit and remove the spring from Cleaner Arm Unit. Then remove the Cleaning Arm Unit as shown in Figure M18.

(Installation)

1. Install the cleaning Arm Unit, then hang the spring on Cleaning Arm Unit.
2. Install the T1 Guide and tighten 2 screws (A).
3. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller is rotated when the cylinder is rotated by hand,.
4. T1 Guide position adjustment should be performed.

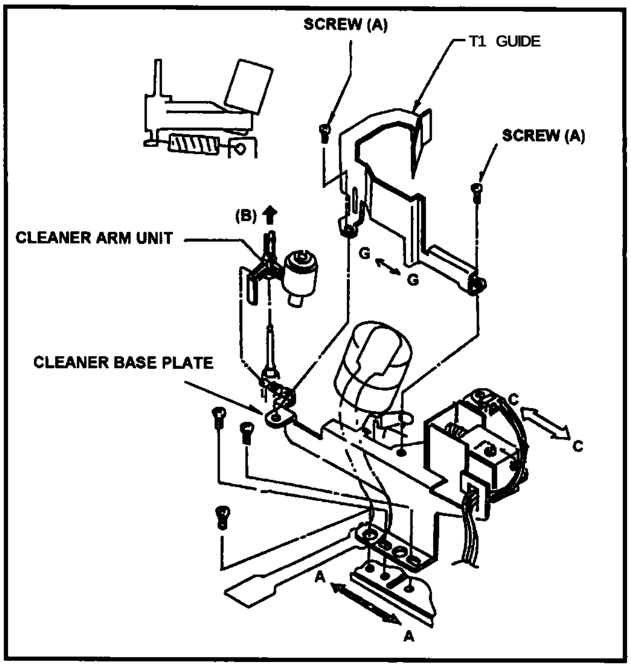


Fig. M18

12-1. T1 Guide Position Adjustment

Place the unit in Loading completion mode.

<How to Make the No Tape Loading>

- Set a black tube to TAPE LED sensor.
- Turn on the power and then the VTR begins loading without tape. And unplug DC input to the unit.

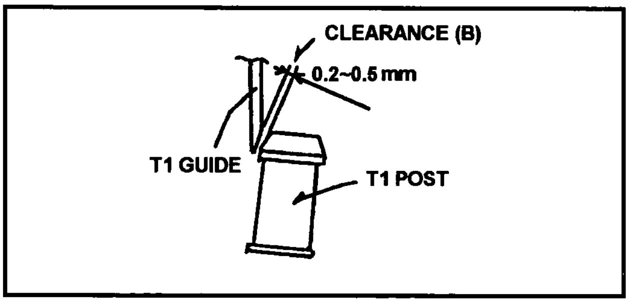


Fig. M19

1. Observe the clearance (B) between T1 Guide and T1 post as shown in Figure M19. And make sure that it is within 0.2 to 0.5mm.
2. If not loosen the 2 screws (A) and adjust the position of T1 Guide by moving to arrow direction (G ⇔ G) so that the clearance (B) is within specification. And tighten the 2 screws (A).

13. Cleaner Solenoid Replacement and Adjustment

(Removal)

1. Remove the Cassette Cover both Side Panel, Cassette Up Unit and open VTR MAIN C.B.A.
2. Disconnect the connector P618 on the Servo C.B.A.
3. Unscrew the 2 screws (A) and remove the Cleaner Solenoid Unit as shown in Figure M20.
4. Unscrew the 2 screws (B) and remove the Cleaner Solenoid as shown in Figure M20.

(Installation)

1. Install the new Cleaner Solenoid according to the opposite procedures to removing.
2. After installing, Cleaner Solenoid Position adjustment should be performed as follows.

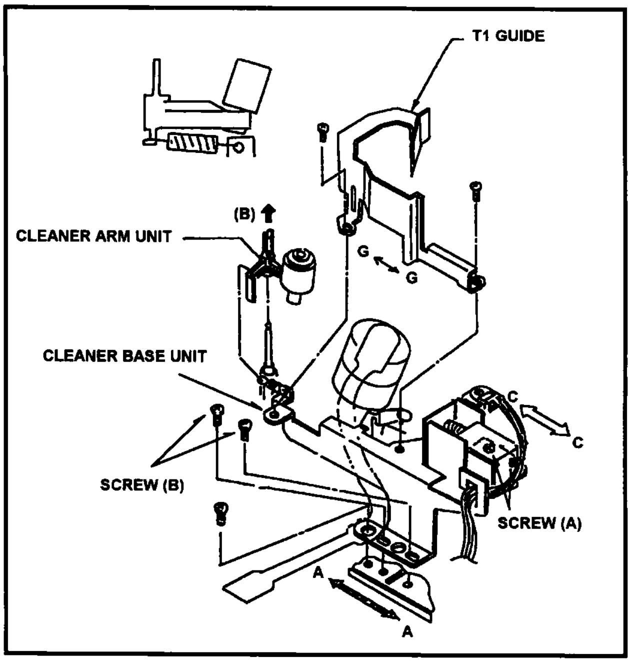


Fig. M20

13-1. Cleaner Solenoid Position Adjustment

❖ Required Tools : Eccentric Driver (VFK0357)

1. Press the iron core of Cleaner Solenoid.
2. Observe the clearance (D) between Cleaning Arm Unit and Cleaner Base Plate as shown in Figure M21. And make sure that it is within 0.5 to 0.7mm.
3. If not, loosen the 2 screws (A) and adjust the position of Cleaner Solenoid Unit by moving to arrow direction (C ⇔ C) with eccentric driver so that the clearance (D) is within specification, And tighten the 2 screws (A).
4. After adjustment, confirm as follows.
5. Press the iron core of Cleaner Solenoid to release, and then return the Cleaning Roller to original position.
6. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller is rotated when the cylinder is rotated by hand.

Note: If removing the cleaner Base Plate, Cleaner Roller Position Adjustment should be performed.

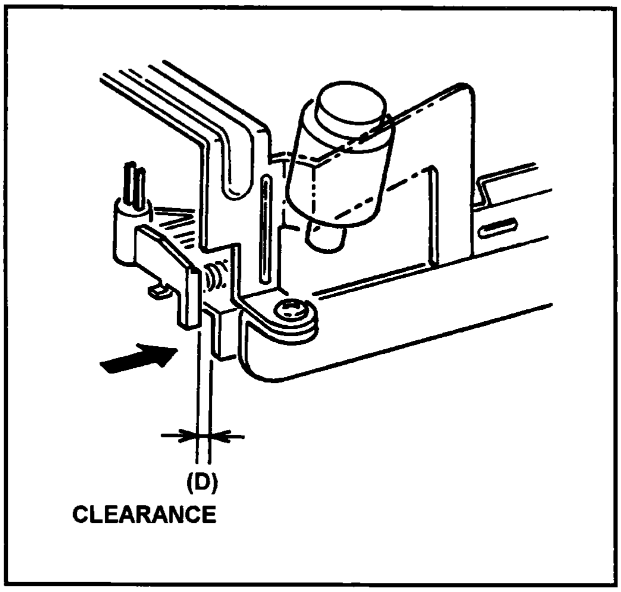


Fig. M21

13-2. Cleaner Roller Position Adjustment

❖ Required Tools : Eccentric Driver (VFK0357)

1. Observe the clearance (A) between Cleaner Roller and Cylinder Unit as shown in Figure M22. And make sure that it is within 1.0 to 1.2mm.
2. If not, loosen the 2 screws (B) and adjust the position of Cleaner Base Plate by moving to arrow direction (A ⇔ A) with the Eccentric Driver so that the clearance (A) is within specification. And tighten the 2 screws (B).

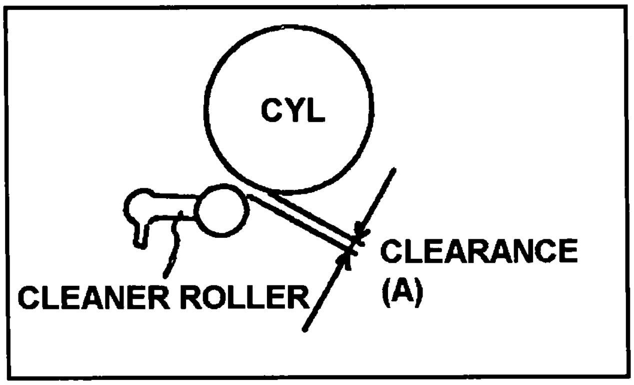


Fig. M22

14. S5 Post Base Unit Replacement

(Removal)

1. Remove the Cassette Up Unit.
2. Unscrew the screw (A) and remove the S5 Post Base Unit as shown in Figure M23.

(Installation)

1. Install the S5 Post Base Unit according to the opposite procedures to removing.
2. After installing, Post Height Pre-adjustment and Linearity Adjustment (Refer to the Section 3.) should be performed.

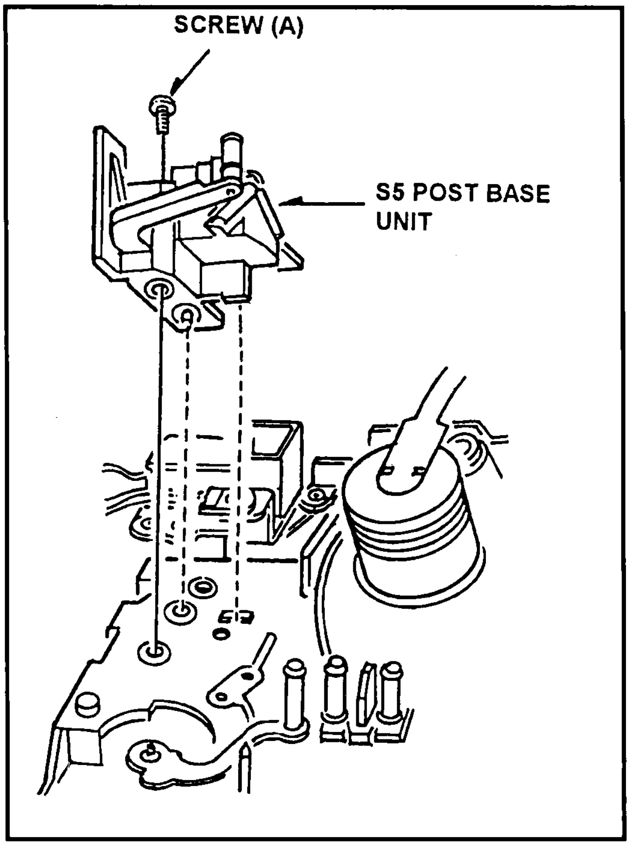


Fig. M23

15. Tension Arm Unit Replacement

(Removal)

1. Remove the Cassette Cover and Left Side Panel.
2. Remove the Cassette Up Unit.
3. Remove the Cut Washer (A) and pick up the Tension Reg. Spring Then remove the Tension Arm Unit as shown in Figure M24.

(Installation)

1. Install the new Tension Arm Unit according to the opposite procedures to removing.
2. After installing, Tension Arm Adjustment should be performed as follows.

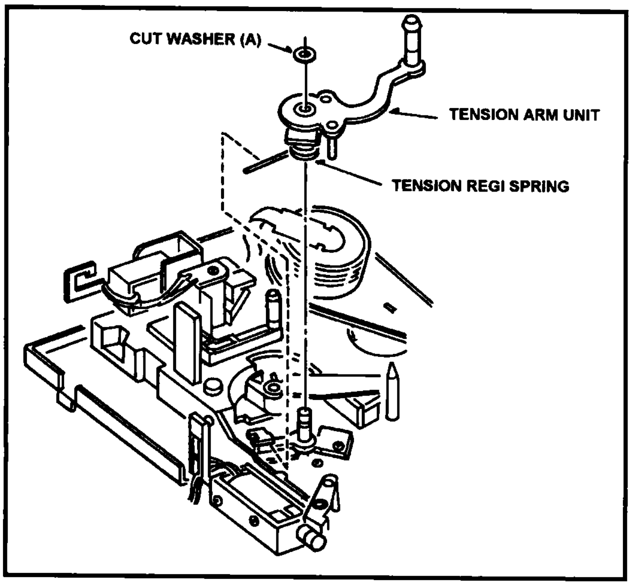
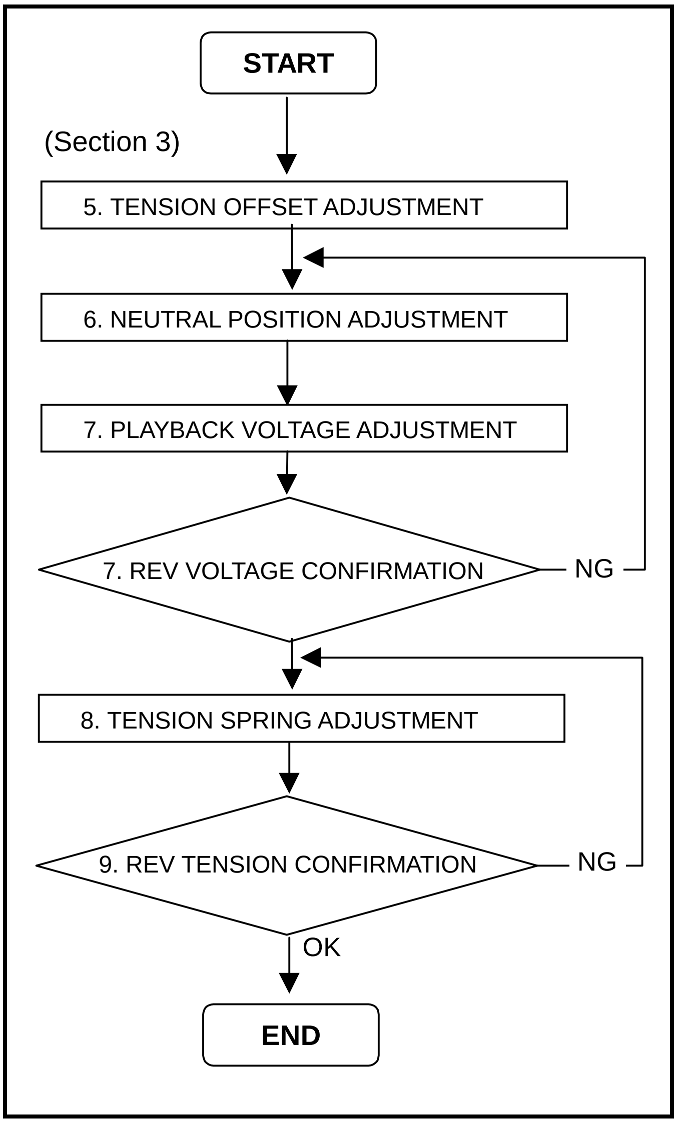


Fig. M24

Tension Arm Adjustment Flowchart


START
(Section 3)
5. TENSION OFFSET ADJUSTMENT
6. NEUTRAL POSITION ADJUSTMENT
7. PLAYBACK VOLTAGE ADJUSTMENT
7. REV VOLTAGE CONFIRMATION
NG
8. TENSION SPRING ADJUSTMENT
9. REV TENSION CONFIRMATION
NG
OK
END

16. Brake Solenoid Position Adjustment.

1. Press the iron core of the Brake Solenoid.
2. Loosen the 2 screws (A) for S-Brake Solenoid and adjust position of Solenoid unit by moving to slightly left or right so that the clearance (A) is within 0.8 ± 0.2mm.

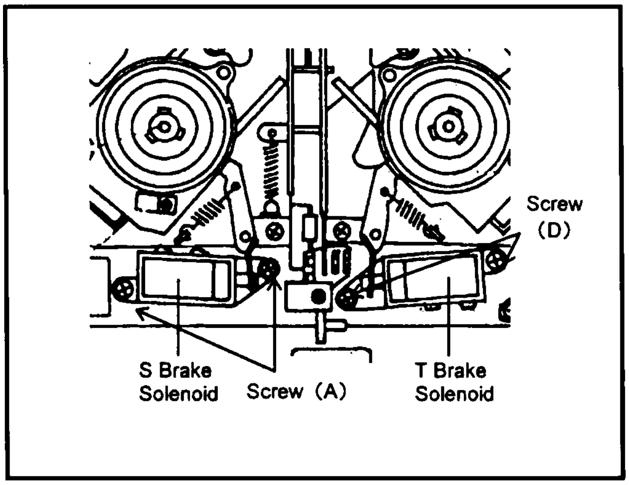


Fig. M25

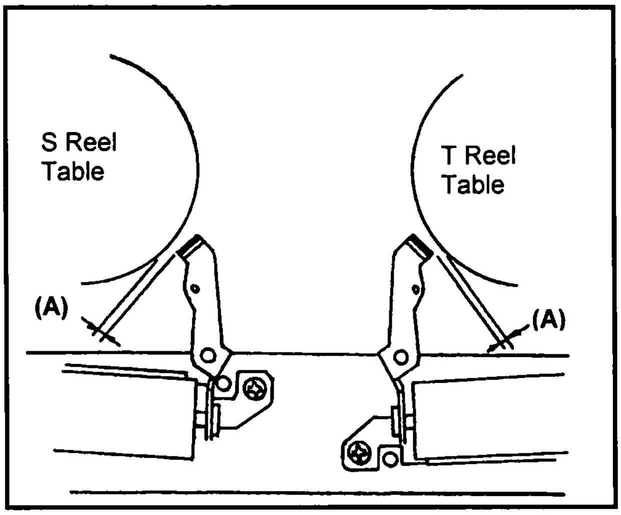


Fig. M26

17. Thrust Adjustment Screw Replacement

1. Remove the Thrust Adjustment Screw.
2. Enforce cleaning of point department of capstan shaft with an applicator.
3. Put the oil (VFK0906) on a new Thrust Adjustment Screw, and install the upper end of the Capstan Housing.
4. Turn the Thrust Adjustment Screw slowly to clockwise until the Capstan Rotor just starts turning (separate from the Capstan Rotor).
5. Turn the Thrust Adjustment Screw another an angle of 270° from 180°(about 225°) clockwise as shown in the Fig. M8.
6. Put the glue (Ex: Three Bond 1401B) on the Thrust Adjustment Screw.
7. Confirm whether the Oil Seal doesn't come in contact with the Capstan Housing.

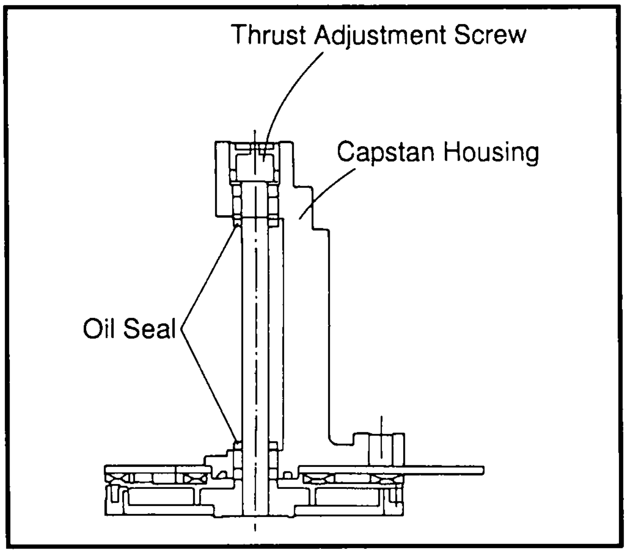


Fig. M27

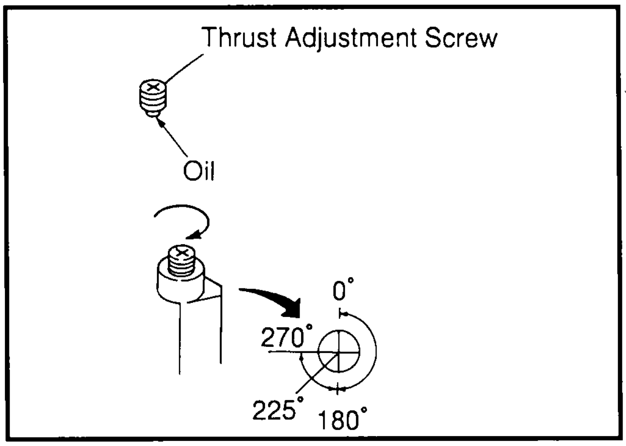
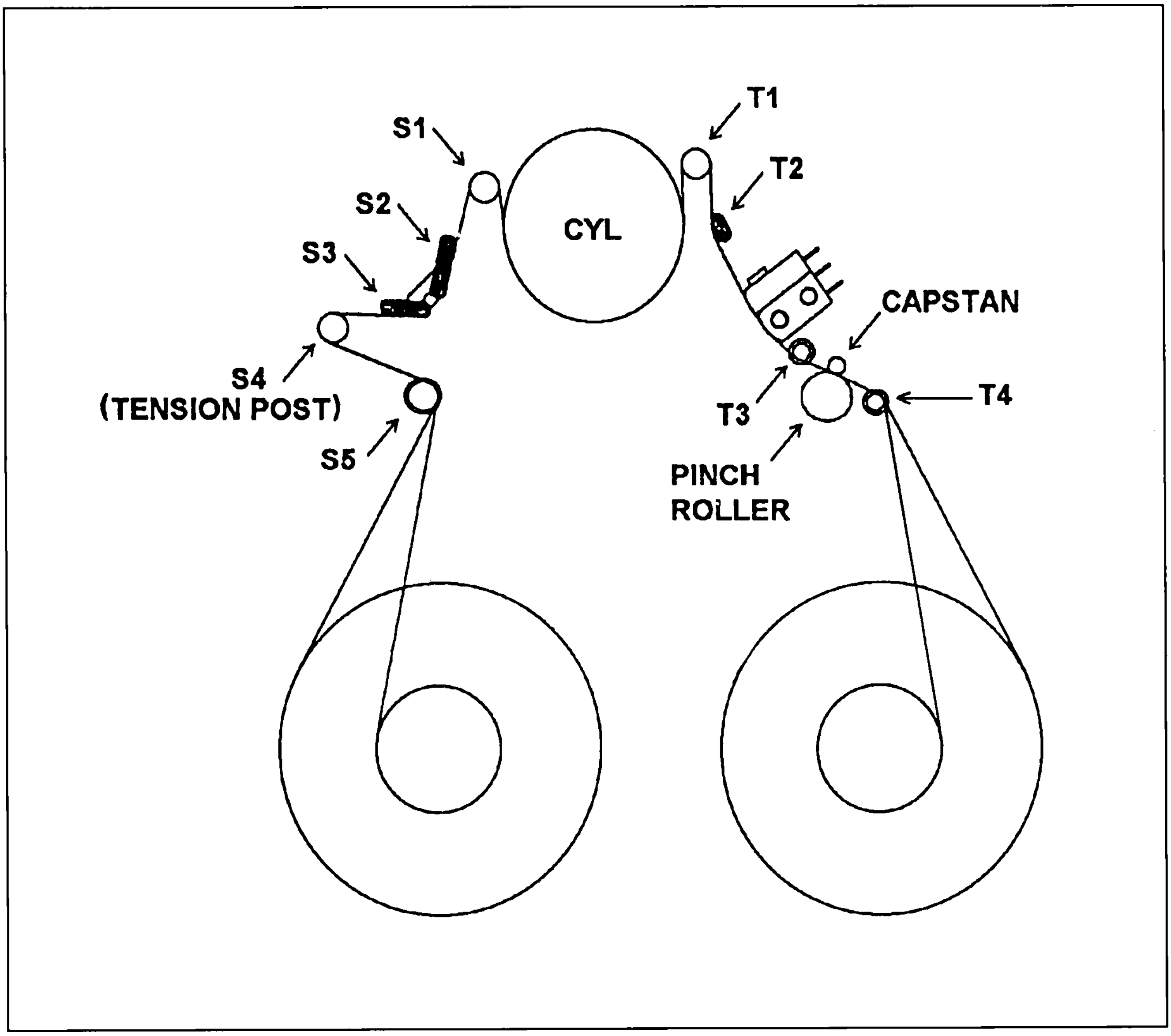


Fig. M28

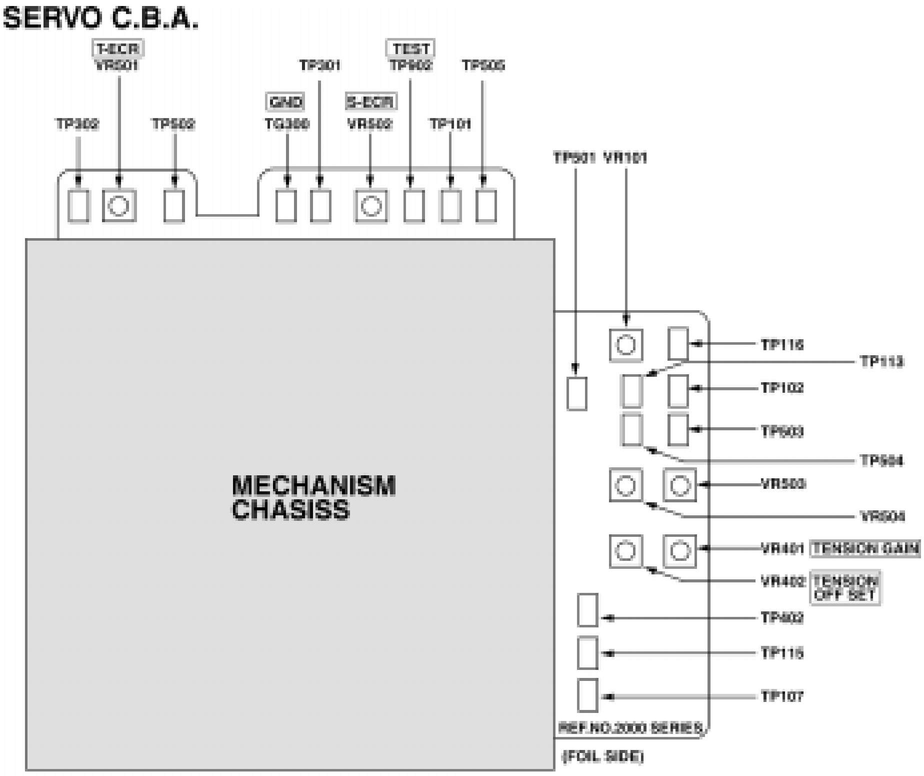
Mechanical Adjustment

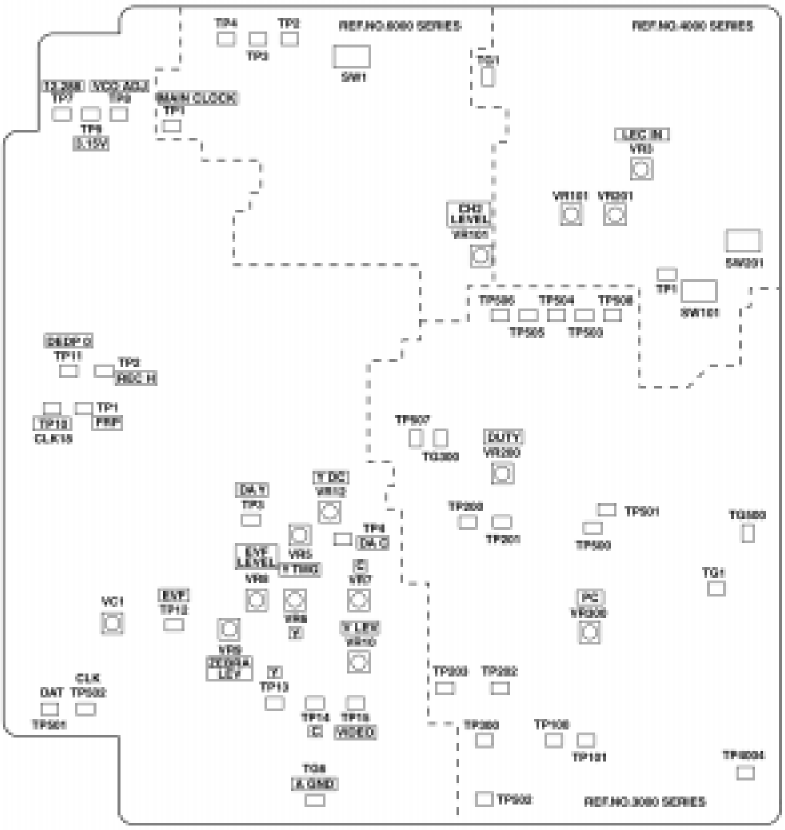
Name of tape transportation



TP & VR location

SERVO C.B.A.
VTR MAIN C.B.A.



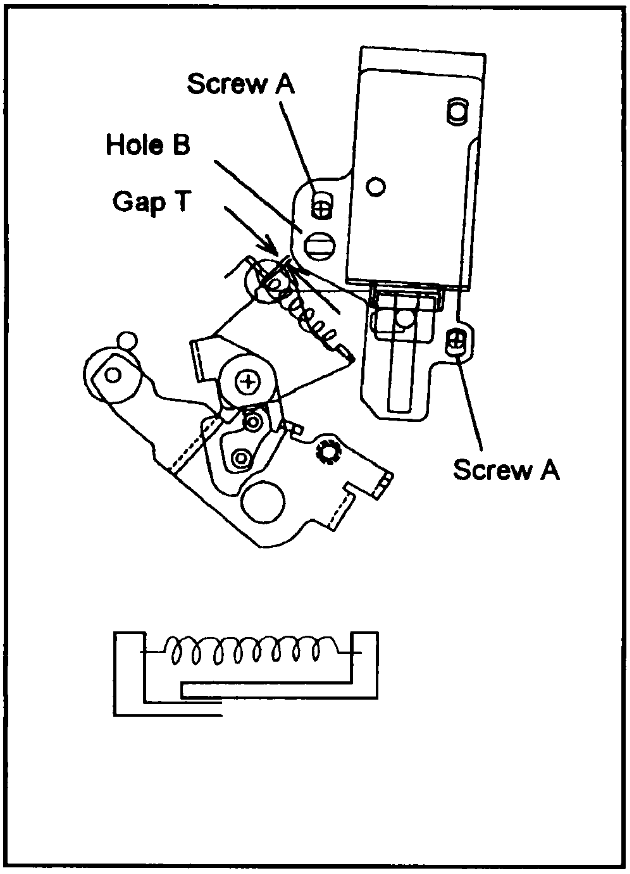


(COMPONENT SIDE)

1. Pinch Solenoid Adjustment

SPEC.	T=0.3mm
TEST	Gap T
ADJUST	Screw A, Hole B
MODE	Eject (Power OFF)
TOOL	VFK0357

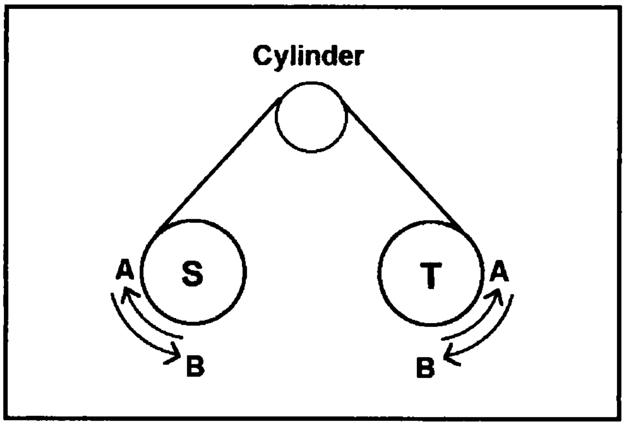
1. Confirm the power off.
2. Push the pinch roller by hand to be close to capstan.
3. Push the pinch solenoid by hand so that the pinch roller contacts capstan.
4. Loosen the two screws A.
5. Adjust the hole B so that gap T is within specification.
6. Tighten the two screws A.



2. Main Brake Torque Confirmation

SPEC.	Direction A : more than 100g Direction B : more than 20g
TEST	S Reel, T Reel
MODE	Eject (Power OFF)
TOOL	VFK71, VFK1191, VFK1152

1. Confirm the power off.
2. Remove the Cassette Up Unit.
3. Install the adapter (VFK1152) to the torque gauge (VFK71).
4. Put the torque gauge on S Reel.
5. Turn the torque gauge to direction A until S Reel slips against brake.
6. Confirm the torque is within specification.
7, Put the torque gauge on T Reel.
8. Turn the torque gauge to direction A until T Reel slips against brake.
9. Confirm the torque is within specification.
10. Install the adapter (VFK1152) to the torque gauge (VFK1191).
11. Put the torque gauge on S Reel.
12. Turn the torque gauge to direction B until S Reel slips against brake.
13. Confirm the torque is within specification.
14. Put the torque gauge on T Reel.
15. Turn the torque gauge to direction B until T Reel slips against brake.
16. Confirm the torque is within specification.



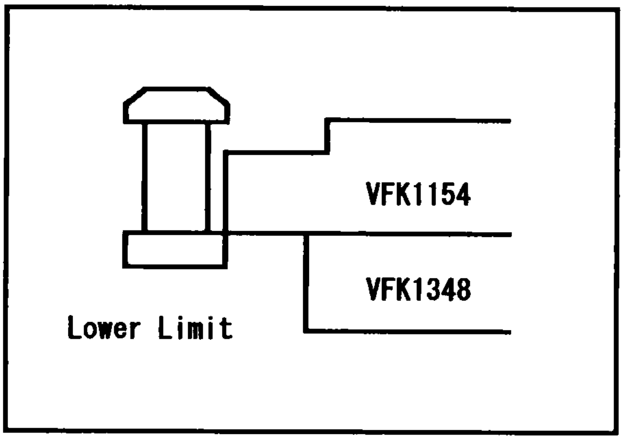
3. Post Height Preadjustment

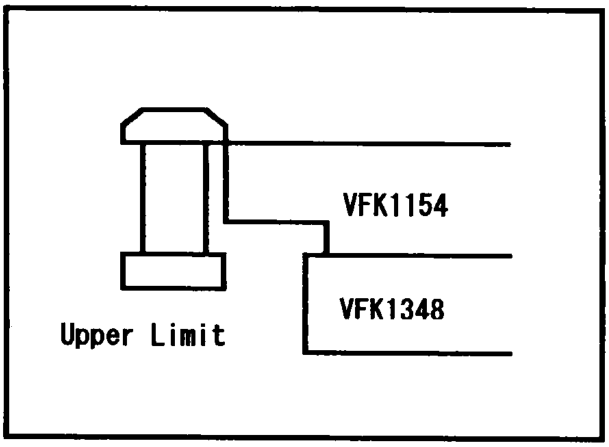
Mode	EJECT (Power OFF)
Tool	VFK1348, VFK1154

1. Turn the power OFF and then set the tube* to cover the sensor LED and place the unit in no tape loading mode.
2. Install the Mech. Neutral Plate and adjust each post height as shown in figure.

Note. Lower* : Turn S4 and S5 posts 1 round more counterclockwise from lower limit position.

Post	Limit	Post Driver
S4	Lower*	VFK1149
T5	Lower*	VFK1149
T3	Lower	VFK1151 (2.5mm Nut Driver)
T4	Lower	VFK1151 (2.5mm Nut Driver)





4. Reel Torque Adjustment

BOARD	Servo
SPEC.	20 ± 2mV
TEST	TP301(S), TP302(T), TG300(GND)
ADJUST	VR501(T), VR502(S)
MODE	PLAY
M.EQ	Digital Volt Meter

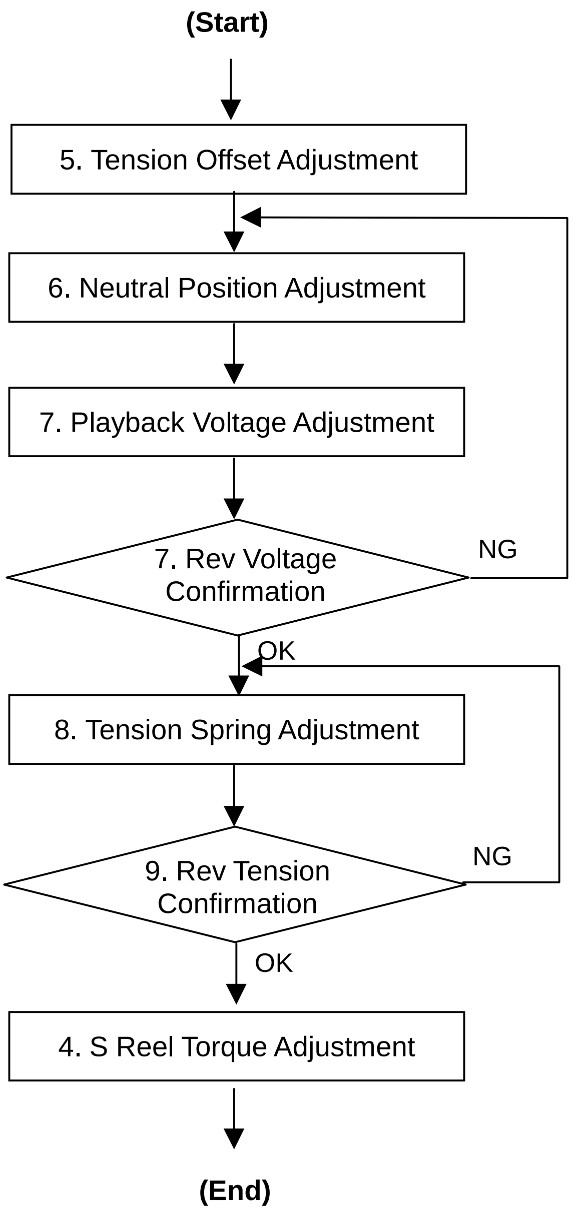
The S Reel Torque adjustment should be perform, after completed the "Tension Adjustment."

1. Confirm the power off and make a short-circuit between TP116 and TP505.
2. Turn the power ON and place the unit in no tape loading mode.
3. Hold the S-Reel by hand and press the PLAY key.
4. Adjust the VR502 so that the TP301 (for S Reel) is within specification.
5. Hold the T-Reel by hand and press the PLAY key.
6. Adjust the VR501 so that the TP302 (for T Reel) is within specification.
7, Make a open-circuit between TP116 and TP505.

Note.

1. Make a tube* by yourself.

Tension Adjustment Flowchart


(Start)
5. Tension Offset Adjustment
6. Neutral Position Adjustment
7. Playback Voltage Adjustment
7. Rev Voltage Confirmation
NG
OK
8. Tension Spring Adjustment
9. Rev Tension Confirmation
NG
OK
4. S Reel Torque Adjustment
(End)

5. Tension Offset Adjustment

BOARD	Servo
SPEC.	2.5 ± 0.05V
TEST	TP402
ADJUST	VR402
MODE	EJECT
M.EQ	Digital Volt Meter

1. Adjust the VR402 so that the DC voltage at TP402 is within specification.

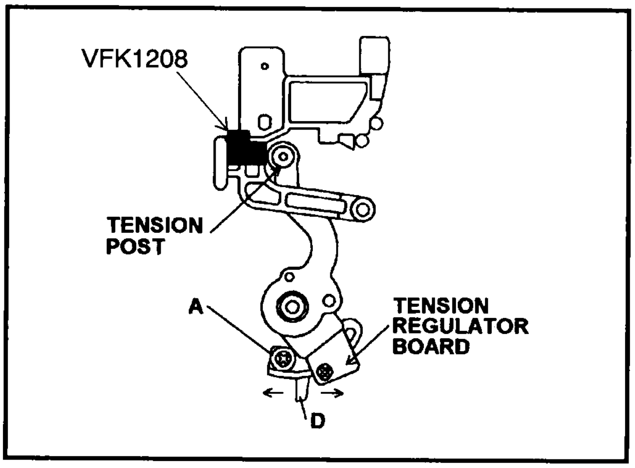
6. Neutral Position Adjustment

BOARD	Servo
SPEC.	2.5 ± 0.1V
TEST	TP402
ADJUST	Sensor
MODE	STOP
TOOL	VFK1208
M.EQ	Digital Volt Meter

1. Remove the cassette up unit.
2. Set the tube* to cover the sensor LED and place the unit in on tape loading mode.
3. Install the black spacer with hole (VFK1208) as shown in figure. Adjust the sensor position so that the TP402 voltage is within specification. To adjust, loosen the screw A and adjust the lever D.

Note.

1. Make a tube* by yourself.



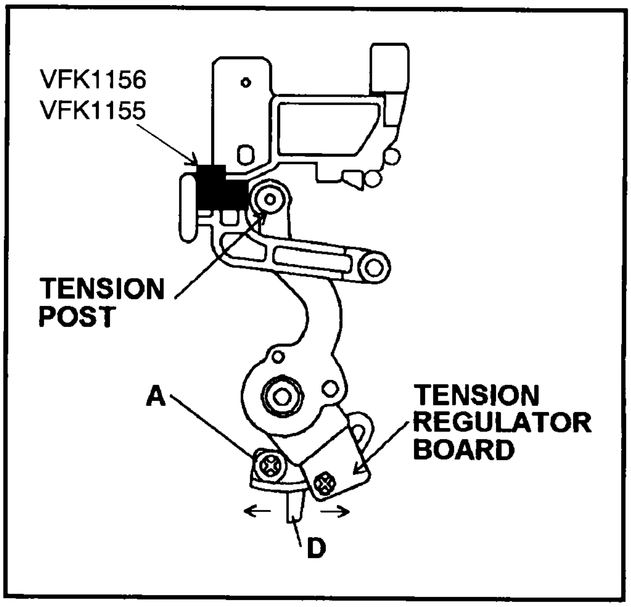
7. Play & Rev Tension Adjustment

BOARD	Servo
SPEC.	(PLAY) 3.8 ± 0.05V (REV) 1.2 ± 0.3V
TEST	TP402
ADJUST	VR401
MODE	STOP
TOOL	VFK1156, VFK1155
M.EQ	Digital Volt Meter

1. Set the tube* to cover the sensor LED and place the unit in no tape loading mode.
2. Install the black spacer (VFK1156) as shown in figure. Adjust the VR401 so that the TP402 voltage is within specification (PLAY). To adjust, loosen the screw A and adjust the lever D.
3. Install the gold spacer (VFK1155) instead of the black one. Confirm that the TP402 voltage is within specification (REV).

Note.

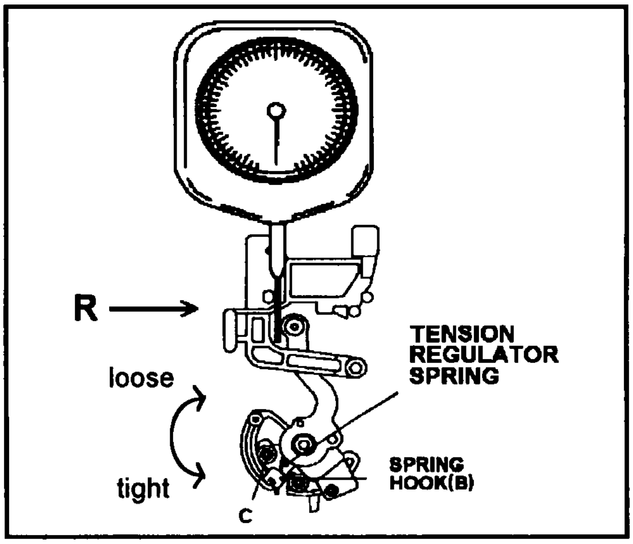
1. Make a tube* by yourself.
2. In case that it is impossible to adjust within specification, readjust from Neutral Position Adjustment.



8. Tension Spring Adjustment

BOARD	Servo
SPEC.	11 ± 1g
TEST	TP402
ADJUST	Spring hook(B)
MODE	STOP
TOOL	VFK1188
M.EQ	Digital Volt Meter

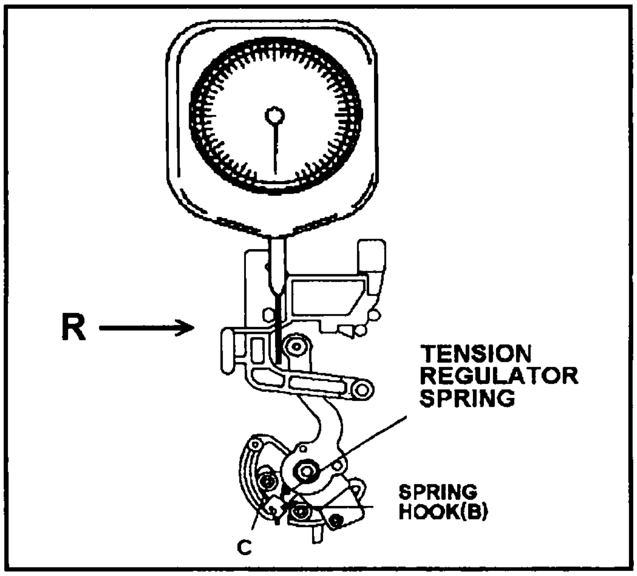
1. Remove the cassette up unit.
2. Set the tube* to cover the sensor LED and place the unit in no tape loading mode.
3. Insert the tension gauge to push the tension post to the direction R until the voltage at the TP402 is 3.8V(PLAY position).
4. Adjust the position of hook(B) so that the indication of gauge is within specification. To adjust hook(B), loosen the screw(C).



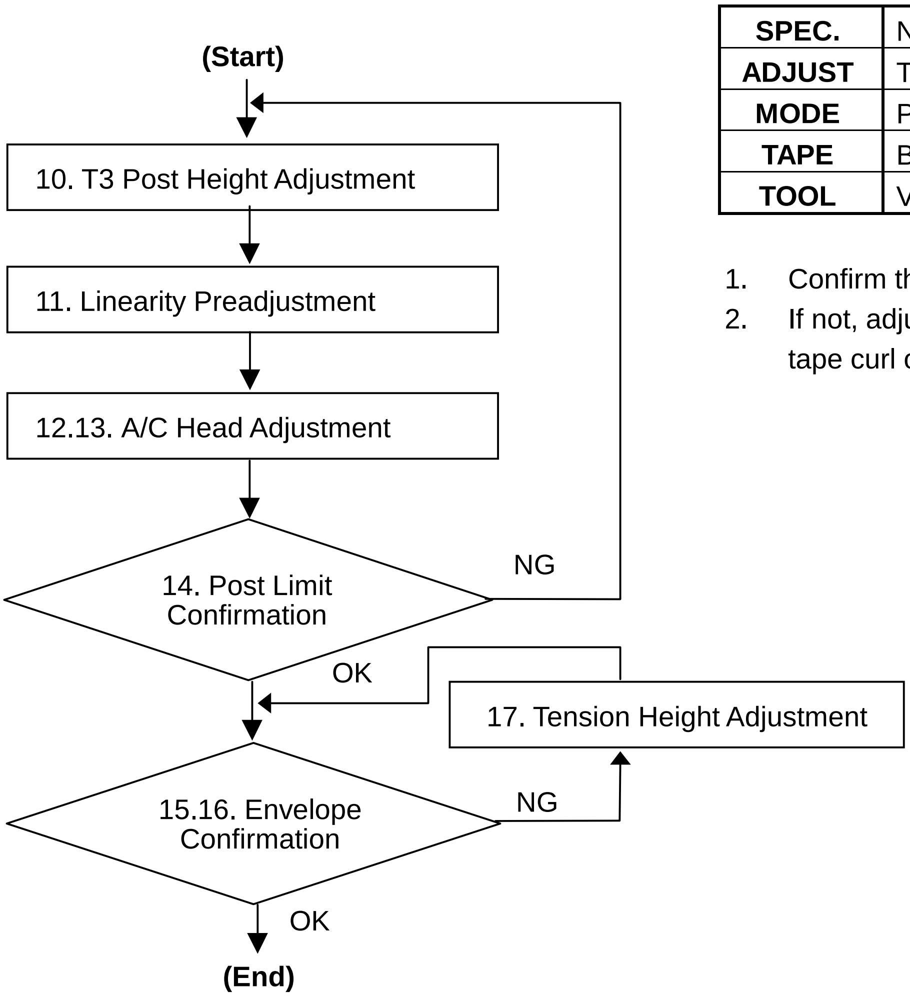
9. REV Tension Confirmation

BOARD	Servo
SPEC.	18 ± 2g
TEST	TP402
MODE	STOP
TOOL	VFK1188
M.EQ	Digital Volt Meter

1. Set the tube* to cover the sensor LED and place the unit in no tape loading mode.
2. Insert the tension gauge to push the tension post to the direction R until the voltage at the TP402 is 1.2V(REV position).
3. Confirm that the indication of gauge is within specification. If not, make the Tension Spring Adjustment again.



Tape Path Adj. Flowchart

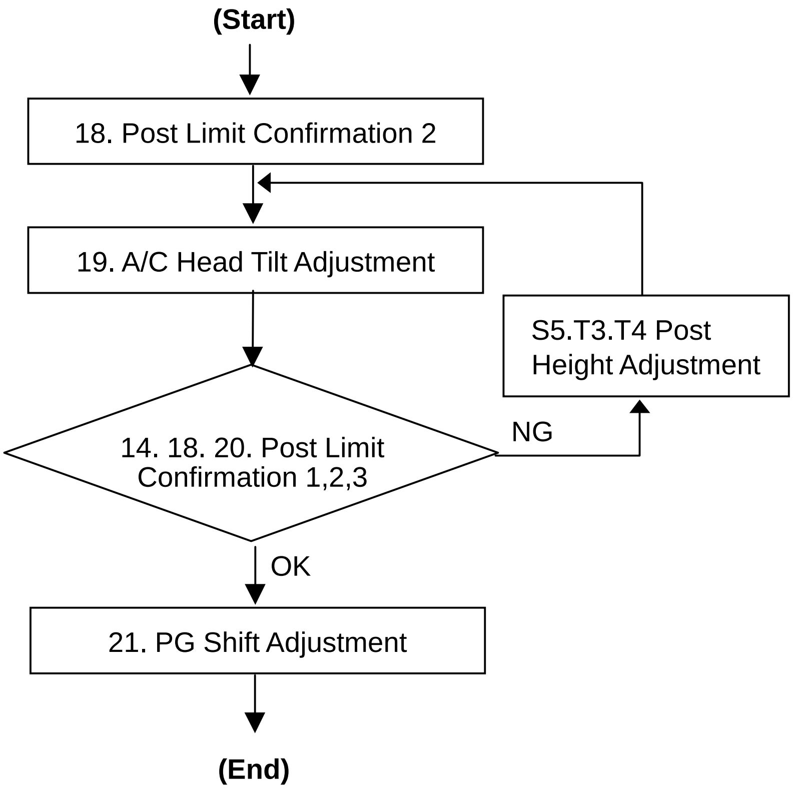

(Start)
10. T3 Post Height Adjustment
11. Linearity Preadjustment
12.13. A/C Head Adjustment
14. Post Limit Confirmation
NG
OK
17. Tension Height Adjustment
15.16. Envelope Confirmation
NG
OK
(End)

10. T3 Post Height Adjustment

SPEC.	No tape curl
ADJUST	T3 Post Height
MODE	PLAY
TAPE	Blank tape
TOOL	VFK1151

1. Confirm that the tape has no curl at T3 post.
2. If not, adjust the T3 post height so that no tape curl occurs to the tape edge.

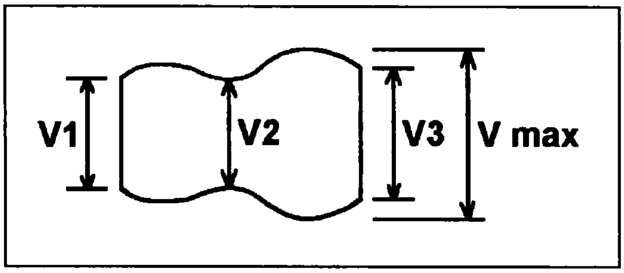
Post Limit Confirmation Flowchart


(Start)
18. Post Limit Confirmation 2
19. A/C Head Tilt Adjustment
S5.T3.T4 Post Height Adjustment
14. 18. 20. Post Limit Confirmation 1,2,3
NG
OK
21. PG Shift Adjustment
(End)

11. Linearity Preadjustment

SPEC.	V1/Vmax, V2/Vmax, V3/Vmax ≥ 0.8
TEST	TP500(VTR MAIN Board)
ADJUST	S1, T1 Post Height
MODE	PLAY(ATF)
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
M.EQ	Oscilloscope
TOOL	VFK1149

1. Playback the alignment tape.
2. Adjust the S1 and T1 posts so that the envelope output is within specification.



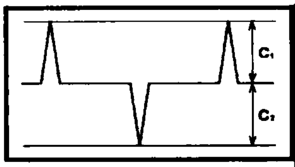
12. A/C Head Height Adjustment

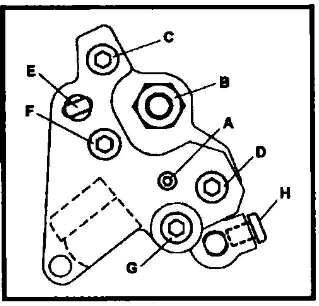
BOARD	Servo
SPEC.	CTL Output : C1, C2 ≥ 220 (mV)
TEST	TP107 : CTL Output
ADJUST	Screw B, H(A/C Head)
MODE	PLAY
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
M.EQ	Oscilloscope
TOOL	VFK1150, VFK1190

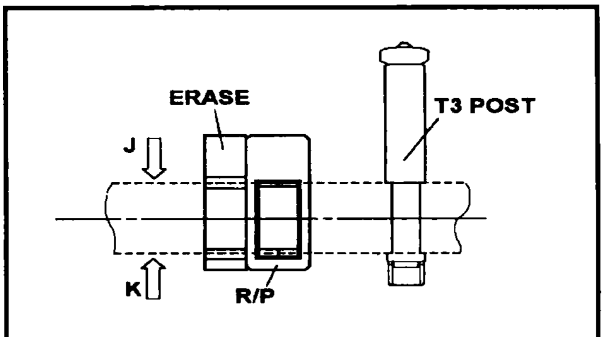
1. Monitor the TP107 on the Servo board.
2. Press the tape to the direction J or K and confirm that the CTL output level is decreased.
3. If direction J increases CTL output, loosen the screw H and adjust the screw B counterclockwise until CTL output is maximized.
4. If direction K increases CTL output, loosen the screw H and adjust the screw B clockwise until CTL output is maximized.
5. After tightening the screw H(2.0kg), confirm the level again.

Note.

1. Adjust alternately with other A/C head adjustments(Azimuth, Height).







A/C HEAD HEIGHT

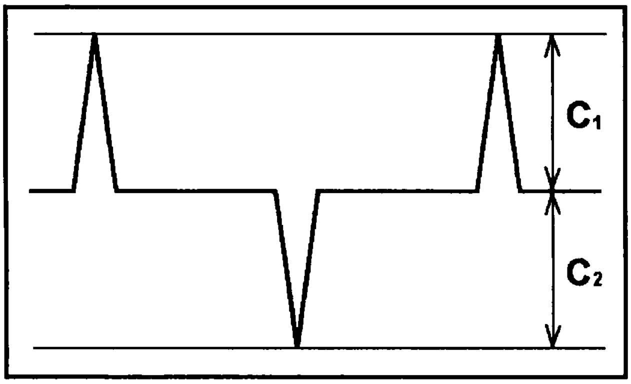
13. A/C Head Azimuth Adjustment

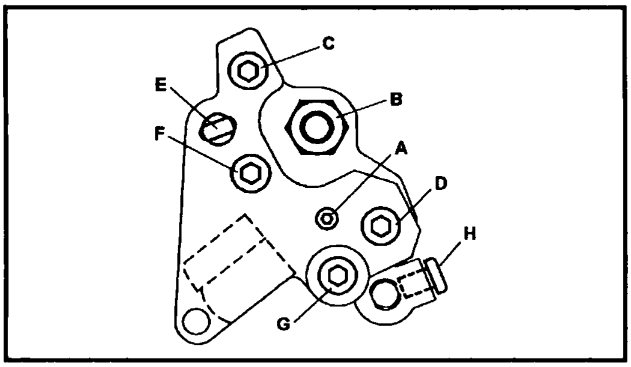
BOARD	Servo
SPEC.	CTL Output : C1, C2=C1 max, C2 max
TEST	TP107 : CTL Output
ADJUST	Screw F(A/C Head)
MODE	PLAY
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
TOOL	VFK1148
M.EQ	Oscilloscope

1. Monitor the TP107 on the Servo Board and adjust the screw F so that the TP107 is maximized.

Note.

1. Adjust alternately with other A/C head adjustments (Tilt, Height).





14. Post Limit Confirmation 1

SPEC.	Post limits shown in the table. No tape curl
MODE	PLAY
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
TOOL	VFK1149 VFK1151

Post Limit Table

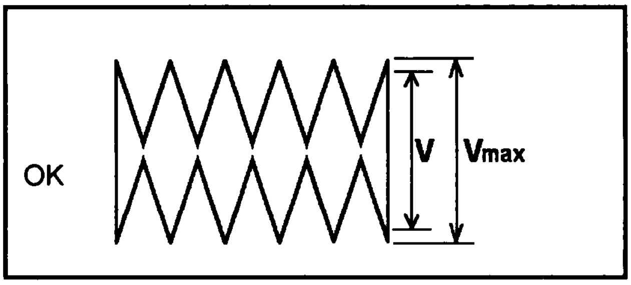
Post	Limit	Adjustment
S5 Post	Lower Limit or Free	S5 Post Height
S4 Post	Lower Limit	S4 Post Height
S1 Post	Upper Limit	Linearity
T1 Post	Upper Limit	Linearity
T3 Post	Lower Limit	T3 Post Height
T4 Post	Lower Limit or Free	T4 Post Height

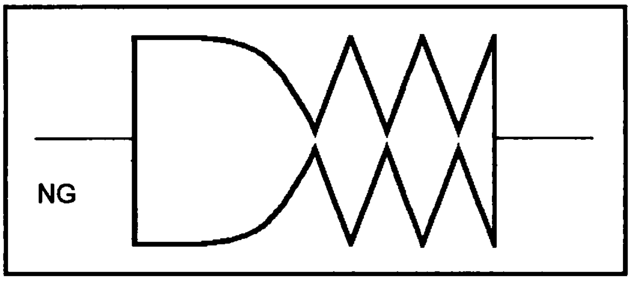
1. Confirm the post limit of each post and adjust in case of need.

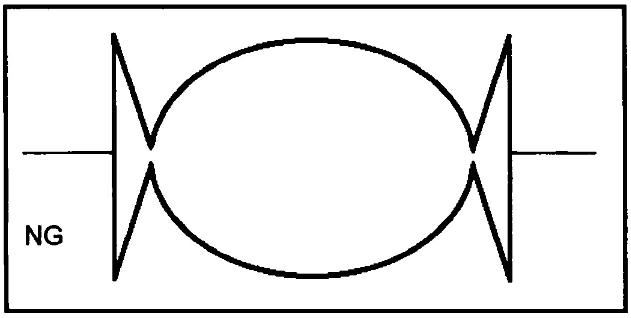
15. Envelope Confirmation 1

SPEC.	V/Vmax ≥ 0.9
TEST	TP500(VTR MAIN Board)
MODE	FF, REW, REV(PLAY & REW)
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
M.EQ	Oscilloscope

1. Confirm the envelope in each mode.
2. If out of specification, adjust the S4 post height again.







* REVX1 Setting

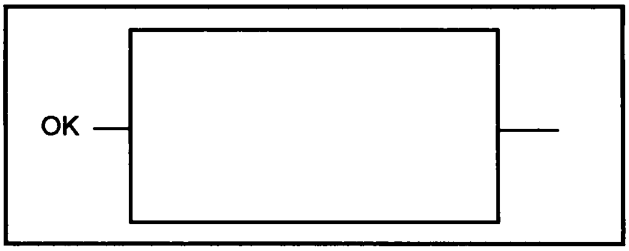
(1) Press the PLAY key repeatedly twice to enter the STILL mode.

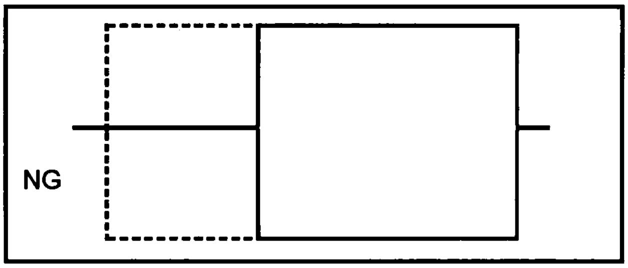
(2) Press the RESET and PLAY buttons at the same time.

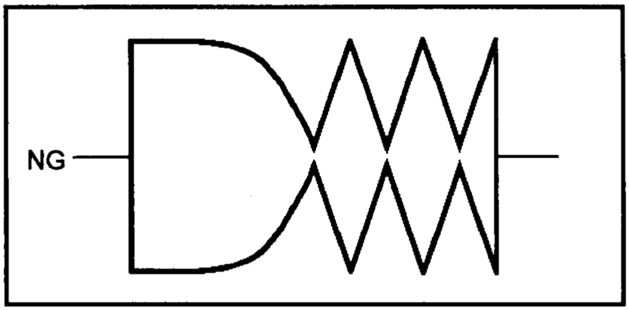
16. Envelope Confirmation 2

SPEC.	Envelope appears immediately.
TEST	TP500(VTR MAIN Board)
MODE	REW/REV(PLAY & REW) → PLAY FF→ PLAY LOADING → PLAY
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
M.EQ	Oscilloscope

1. Confirm that the envelope appears immediately when the mode is switched from REW to PLAY, from REV to PLAY, from FF to PLAY and from LOADING to PLAY.
2. If out of specification, adjust the S4 post height again.







* For the REV mode, refer to the item number 15.

17. Tension Height Adjustment

SPEC.	Envelope appears immediately.
TEST	TP500(VTR MAIN Board)
ADJUST	S1, T1, S4 Post
MODE	REW/REV(PLAY & REW) → PLAY FF → PLAY LOADING → PLAY
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
M.EQ	Oscilloscope

* This adjustment must be done only when out of specification in Linearity Preadjustment, Envelope Confirmation 1 or 2.

1. Turn the S4 post 90 degrees counterclockwise and adjust S1 and T1 posts again.
2. Confirm that the envelope appears immediately when the mode is switched from REW to PLAY, from REV to PLAY, from FF to PLAY and from LOADING to PLAY.
3. If out of specification, repeat 1. again. Do not turn the S4 post more than 360 degrees.

18. Post Limit Confirmation 2

SPEC.	Post limits shown in the table. No tape curl
MODE	REV(PLAY & REW)
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
M.EQ	VFK1149
	VFK1151

Post Limit Table

Post	Limit	Adjustment
S5 Post	Free	S5 Post Height
S4 Post	Lower Limit or Free	S4 Post Height
S1 Post	Upper Limit	Linearity
T1 Post	Free	Linearity
T3 Post	Lower Limit	T3 Post Height
T4 Post	Lower Limit	T4 Post Height

1. Confirm the post limit of each post and adjust again in case of need.

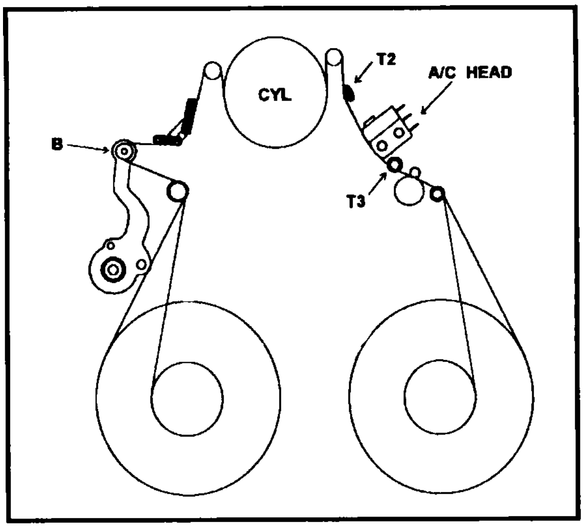
19. A/C Head Tilt Adjustment

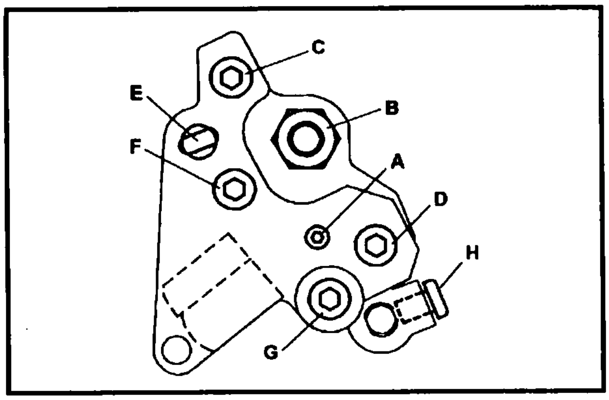
SPEC.	No tape curl, Lower limit at T3 post
ADJUST	Screws A and G(A/C Head)
MODE	PLAY
TAPE	Blank tape
TOOL	VFK1148, VFK1178

1. Confirm that the screw (G) is tightened with 1.0kg of torque.
2. Play back the tape and adjust the A/C head tilt with screw (A) so that the tape path has lower limit at T3 post.

Note.

1. Screw(A) : Clockwise : Tape goes up at T3 post. Counterclockwise : Tape goes down.
2. The final touch of the adjustment must be turned clockwise.
3. Adjust alternately with each A/C head adjustment(Azimuth, Height).





20. Post Limit Confirmation 3

SPEC.	Post limits shown in the table. No tape curl
MODE	FF, REW
TAPE	L cassette(beginning or ending portion) NTSC : VFM3580KL PAL : VFM3680KL
TOOL	VFK1149 VFK1151

Post Limit Table

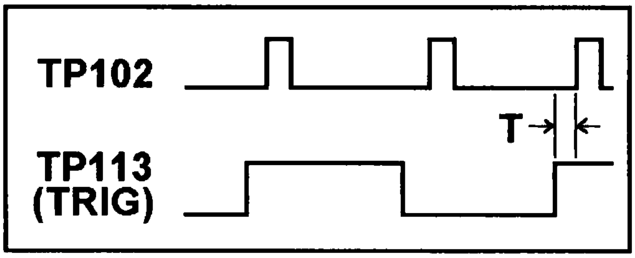
Post	Limit	Adjustment
S5 Post	Free	S5 Post Height
S4 Post	Lower Limit or Free	S4 Post Height
S1 Post	Upper Limit	Linearity
T1 Post	Free	Linearity
T3 Post	Free	T3 Post Height
T4 Post	Lower Limit or Free	T4 Post Height

1. Confirm Post Limit Confirmation 1 and 2 playing back beginning or ending portion of L cassette.
2. Confirm the post limit of each post and adjust again in case of need.
3. If T3 post is adjusted, confirm that the tape has no curl at T3 post when loading or unloading.

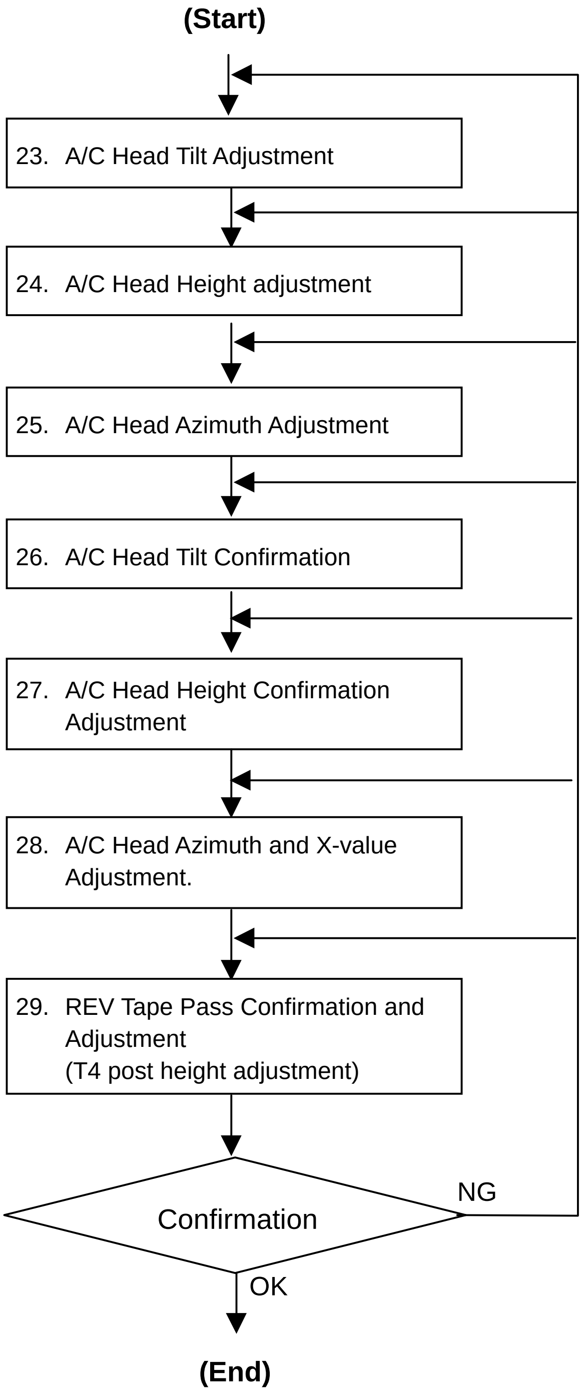
21. PG Shifter Adjustment

BOARD	Servo
SPEC.	126.3 ± 2.5 µs
TEST	TP113, TP102
ADJUST	VR101
MODE	PLAY
TAPE	NTSC : VFM3580KL PAL : VFM3680KL
M.EQ	Oscilloscope

1. Adjust the VR101 so that the T is within specification (Trigger : TP113).



A/C Head Adj. Flowchart

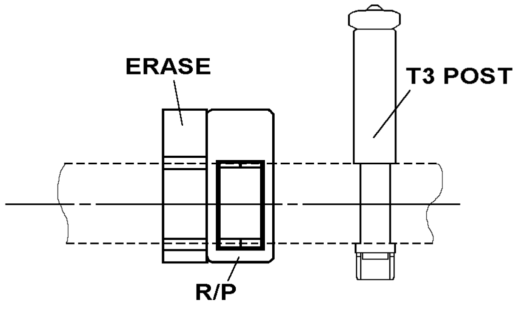

(Start)
23. A/C Head Tilt Adjustment
24. A/C Head Height adjustment
25. A/C Head Azimuth Adjustment
26. A/C Head Tilt Confirmation
27. A/C Head Height Confirmation Adjustment
28. A/C Head Azimuth and X-value Adjustment.
29. REV Tape Pass Confirmation and Adjustment (T4 post height adjustment)
Confirmation
NG
OK
(End)

22. A/C Head Adjustment Method

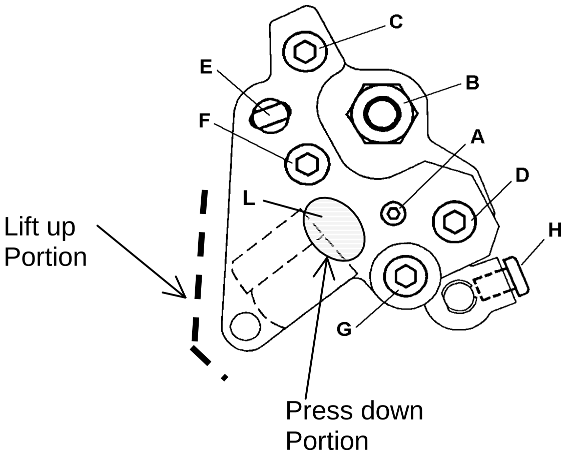
Adjustment Item	SCREW	Adjustment Method	Torque
Tilt adjustment	A	Tighten direction……Decrease CUE Loosen direction……Increase CUE	
Height adjustment	B	Tighten direction……In case of increase CTL, when A/C Head Press down. Loosen direction……In case of increase CTL, when A/C Head lift up.	
Azimuth adjustment	F	Phase is adjusted by screw F	
X-value adjustment	C D	Adjust X-value by VFK0357 at Hole (E), then tighten the screw (C) and (D) to fix A/C Head horizontal position.	2.5Kg.cm
Fixed Tilt and Azimuth	G	Screw (G) is always tighten during adjustment except Tilt and Azimuth.	1.0Kg.cm
Fixed height	H	After height adjustment, tighten the screw (H) to fix height of A/C Head.	

SCREW	Tool for adjustment
A	VFK1178 (0.89 mm Hex Driver)
B	VFK1150 (5.5 mm Tool for adjustment)
F	VFK1148 (1.5 mm Hex Driver)
C, D, G	VFK1209 (Torque Driver) VFK0912 (1.5 mm Post Axis Driver)
H	VFK1190 (1.5 mm L type of Hex Wrench)

1. Each adjustment of A/C Head should be perform under the screw (G) tightened.
2. Confirm the screw (A) does not loosen, before execute the A/C Head Tilt adjustment. The screw (A) should be always touch to top of A/C Head.
3. Be careful the tape damage at T3 Post, when adjust tilt of A/C Head.
4. When the height of A/C Head is adjusted by Nut (B), first the screw (H) should be loosen. And after height adjustment finished, tighten the screw (H) lightly.
5. Each adjustment of A/C Head should be finished at the condition of turn the each adjustment screw tighten direction. And hit the portion (L) lightly for remove the distortion.
6. Adjust alternately each A/C Head adjustment with Envelope Waveform adjustment.



A/C HEAD HEIGHT



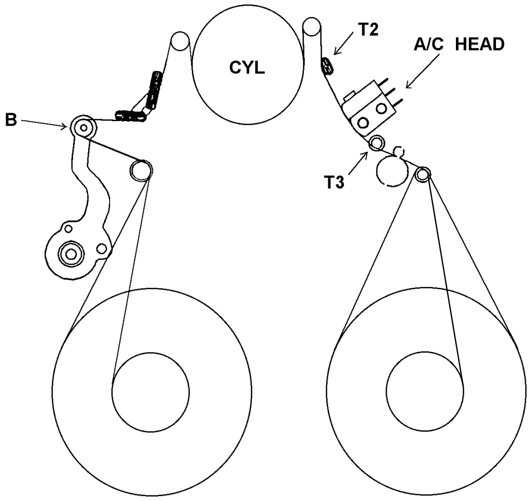
23. A/C Head Tilt Adjustment

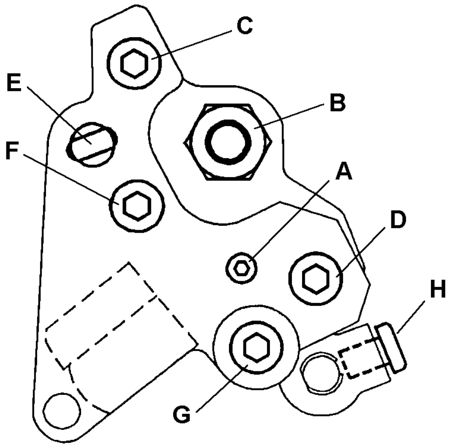
SPEC	Lower limit at T3 Post No tape curl
ADJUSTMENT	SCREW A and G (A/C Head)
MODE	PLAY
TAPE	Blank Tape
M.EQ	VFK1148, VFK1178 (Hex Driver)

1. Play back the tape and adjust **screw (A)** for adjustment of tilt of A/C Head so that the tape path has lower limit without curl at T3 post.
2. To adjustment, loosen the screw (G) and make curl on tape at lower flange of T3 post by screw (A). And tighten screw (A) accordingly for find the point of curl disappeared. After finish adjustment for screw (A), tighten the screw (G) is tightened with 1.0Kg/cm of torque.

(NOTE)

1. In case of turn clockwise screw (A).
   → Tape goes up at T3 post.
   In case of turn counter-clockwise screw (A).
   → Tape goes down at T3 post.
2. When screw adjustment finished, with each adjustment screw on A/C Head should be finished tighten direction. And confirm that the screw does not loosen.
3. Adjust and confirmation should be performed alternately with each A/C head adjustment (Azimuth and Height).





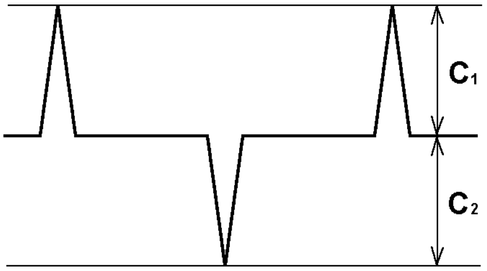
24. A/C Head Height adjustment

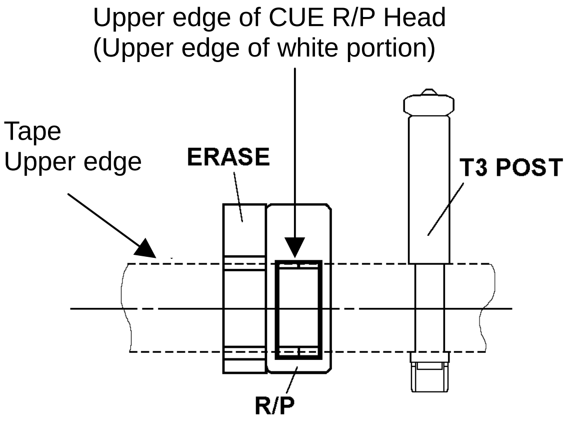
BOARD	SERVO
SPEC	CTL Output (C1,C2 ≥ 220mV)
TEST POINT	TP107:CTL
ADJUSTMENT	SCREW B and H (A/C Head)
MODE	PLAY
TAPE	VFM3580KM, VFM3680KM
M.EQ	Oscilloscope
TOOL	VFK1150 (Nut Driver) VFK1190 (Hex Wrench)

1. Observe the CTL output (**TP107)** on the Servo board.
2. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the **CTL** output level is **decreased**.
3. If increases CTL output, when press the A/C Head. Loosen the **screw H** and adjust the **screw B counterclockwise** until CTL output is maximized.
4. If increases CTL output, when lift up the A/C Head. Loosen the **screw H** and adjust the **screw B clockwise** until CTL output is maximized.
5. After tightening the **screw H (2.0kg)**, confirm the level again.

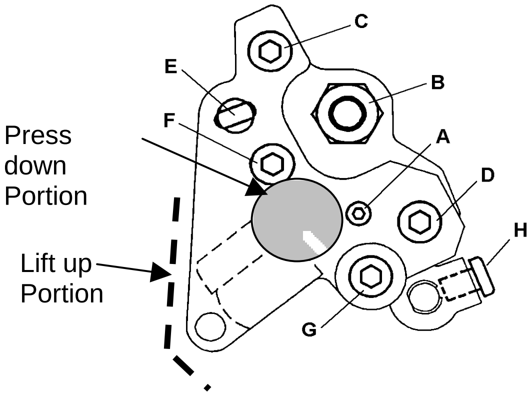
< NOTE >

1. Adjust alternately with other A/C head adjustments (Azimuth, Height).





A/C HEAD HEIGHT



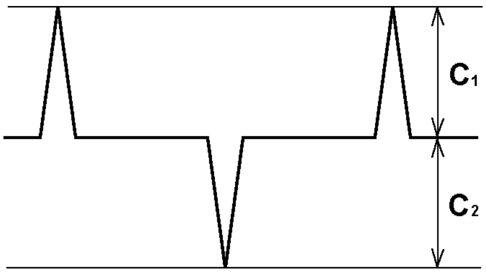
25. A/C Head Azimuth Adjustment

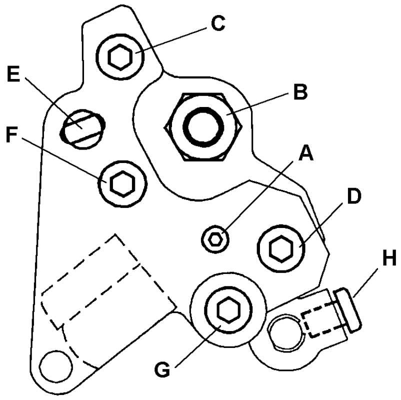
BOARD	SERVO
SPEC	CTL Output:C1,C2 = C1 max, C2 max
TEST POINT	TP107:CTL
ADJUSTMENT	SCREW F (A/C Head)
MODE	PLAY
TAPE	VFM3580KM, VFM3680KM
M.EQ	Oscilloscope
TOOL	VFK1148 (Hex Driver)

1. Observe the CTL output (TP107) on the Servo Board.
2. To adjustment, loosen the screw (G) and adjust screw (F) so that the CTL output become maximum.
3. Tighten screw (G) with 1.0Kg torque.

< NOTE >

1. Adjust alternately with other A/C head adjustments(Azimuth, Height).

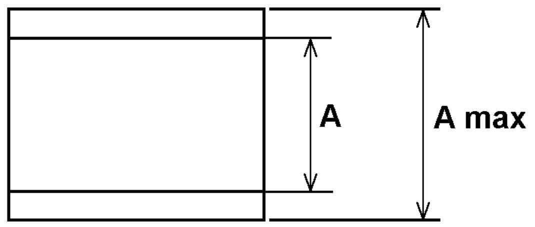


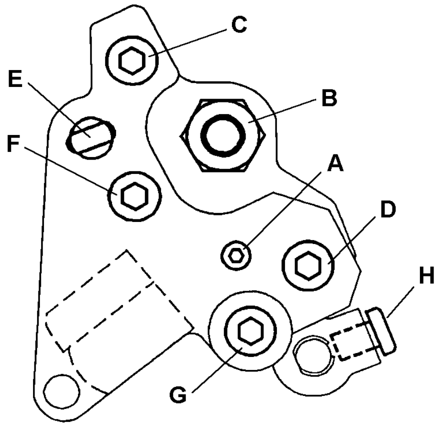


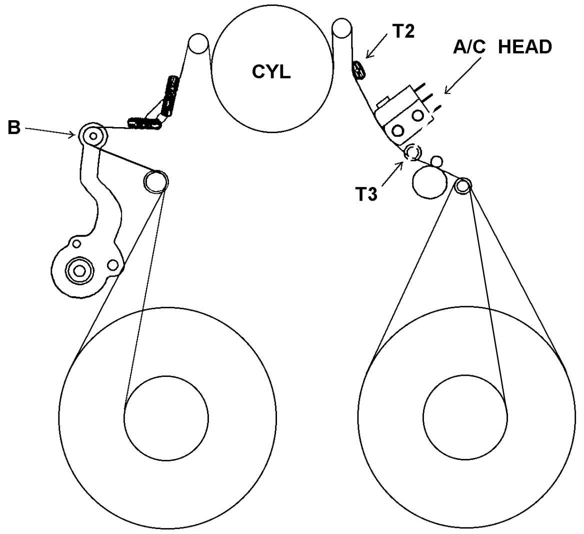
26. A/C Head Tilt Confirmation

SPEC	A/Amax ≥ 0.8
TEST POINT	TP505:CUE AUDIO(LCD Board)
ADJUSTMENT	SCREW A and G (A/C Head)
MODE	PLAY
TAPE	VFM3580KM, VFM3680KM
M.EQ	Oscilloscope
TOOL	VFK1178, VFK1148 (Hex Driver)

1. Playback the CUE portion (6kHz) of the Alignment tape.
2. Confirm that the **screw G** and **H** are not loosened.
3. Push the tension arm follow the arrow (B) direction as shown in figure as range of T2 post does not move. And confirm that the CUE output level is within specification.
4. If out of specification, loosen the **screw G** and adjust the **screw A**, then tighten the **screw G** with **1.0kg** torque.
5. The final touch of the adjustment must be turned clockwise. After this adjustment, confirm that the screw A is not loosened.
6. If adjust the screw A, Confirm that the tape pass condition follow Post Limit Confirmation procedure (item 1-14).



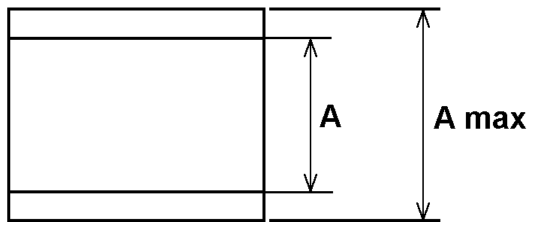


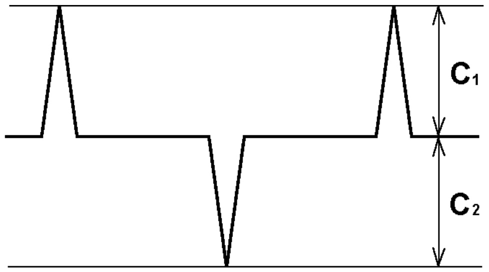


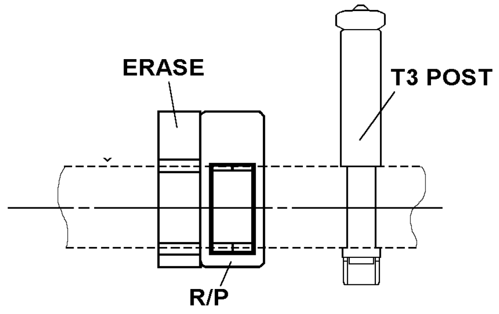
27. A/C Head Height Confirmation

SPEC	A ≥ 0.95 × Amax, C1, C2 ≥ 220mV
TEST POINT	TP505 CUE AUDIO (LCD BOARD) TP107 CTL (SERVO BOARD)
ADJUSTMENT	SCREW B and H (A/C Head)
MODE	PLAY
TAPE	VFM3580KM, VFM3680KM
M.EQ	Oscilloscope
TOOL	VFK1150 (Nut Driver) VFK1190 (Hex Wrench)

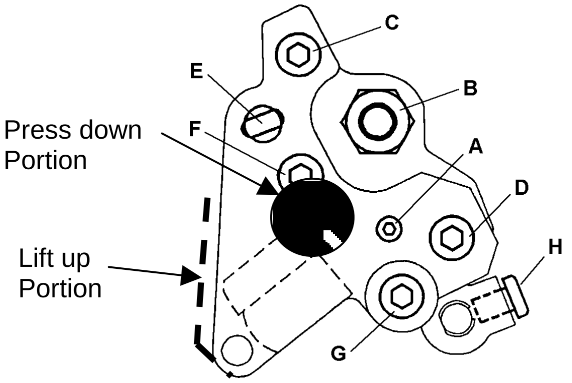
1. Playback the CUE portion (6kHz) of the Alignment tape.
2. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the CUE output level at TP505 does not in**creased**.
3. If increases CUE output, A/C Head Height adjustment performed. And also confirm that the CTL output level.
4. If adjust the height of A/C Head, Azimuth also changed. Therefore adjust and confirm alternately Height and Azimuth of A/C Head.
5. After screw (H) is tightened, height and tilt of A/C Head are changed. Therefore confirmation of specification must be done after tightening the screw (H).







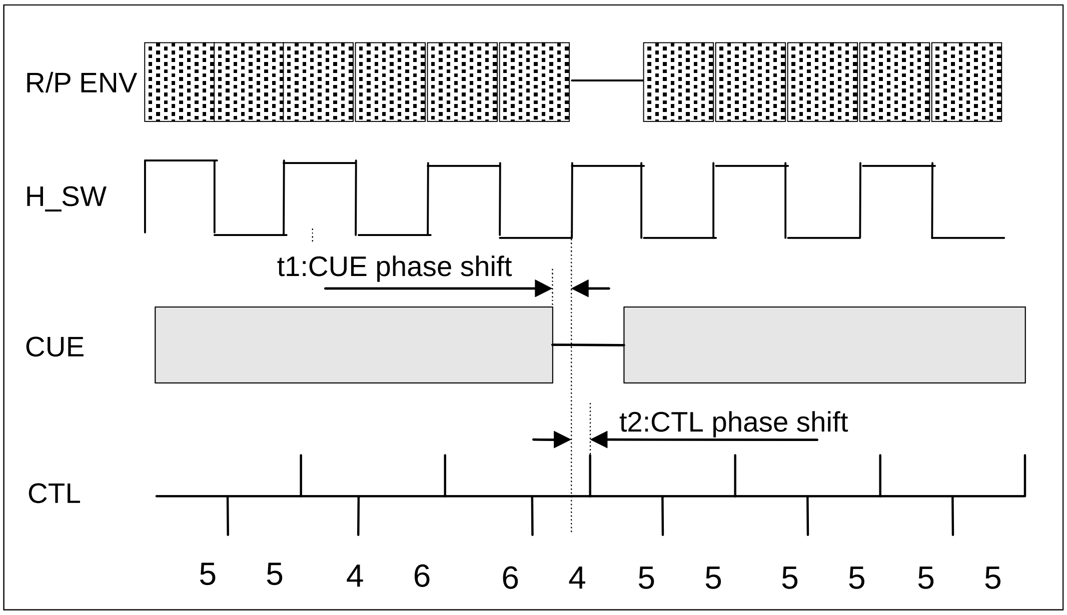
A/C HEAD HEIGHT

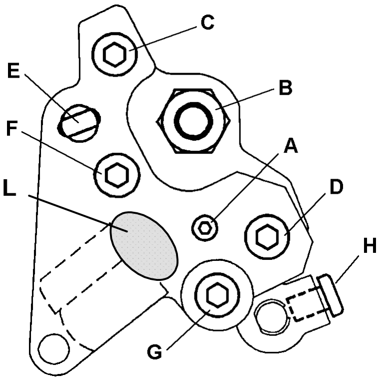


28. A/C Head Azimuth and X-value Adjustment.

SPEC.	As shown in the below figure. -250us ≤ t1 ≤ +250us -250us ≤ t2 ≤ +250us	**TEST POINT**	TP500:R/P ENV (RF Board) TP300:R/P HSW (RF Board) TP505:CUE AUDIO (LCD Board) TP107:CTL (SERVO Board)
ADJUSTMENT	A/C Head each screws	**M.EQ**	Oscilloscope
MODE	Play	**TOOL**	VFK0357 (Eccentric Driver)
TAPE	VFM3582KM, VFM3682KM		

1. Playback the X-value alignment tape.
2. Adjust A/C Head Azimuth (refer to Azimuth adjustment procedure) so that the CTL and Lack part of CUE (t2) is match in the phase.
3. Confirm the lack track of envelope, and select the HSW correspond with it (The lack track is correspond HSW high with L ch).
4. Adjust X-value so that the reference of HSW and CTL trigger (select the next trigger at duty 6 to 4 portion: refer to below figure) are match in the phase (t1). To adjust X-value, loosen the screw C and D, adjust the hole E by VFK0357. After adjustment tighten the screw C and D with 2.5Kg torque. At this time adjust the phase simultaneously with Azimuth so that the CTL and CUE phase is kept.
5. Hit the top plate (portion L as shown in below figure) of A/C Head lightly by a pointed end of Eccentric driver, then confirm the phase is not shifted finally.





29. REV Tape Pass Confirmation and Adjustment (T4 post height adjustment)

SPEC.	C1, C2 ≥ Cp1, Cp2 × 0.75 Lower limit at T3 post on REV mode	**TAPE**	VFM3580KM, VFM3680KM
TEST POINT	TP30 (SERVO:F1)	**M.EQ**	Oscilloscope
ADJUSTMENT	T4 post height	**TOOL**	VFK1151 (Nut Driver)
MODE	REV × 1		

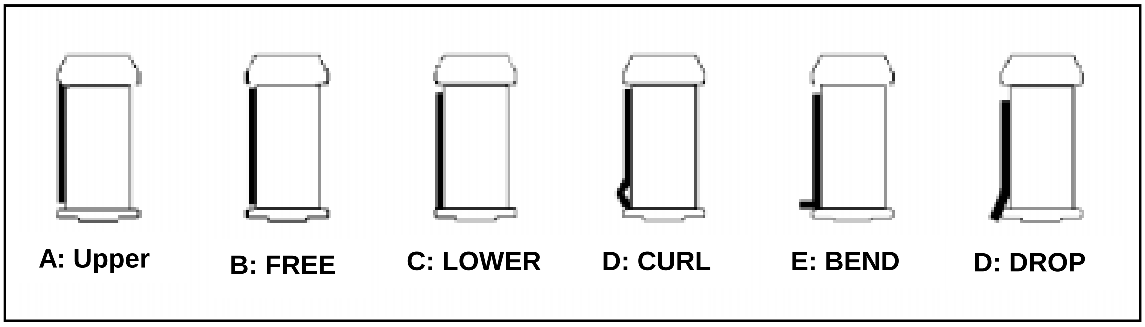
6. Place unit into REV mode, and confirm the post limit and CTL signal are in the specification. IF not, adjust T4 post follow the below procedure.
7. Turn the Nut of T4 post clockwise or counterclockwise follow the tape limit condition at T3 post. The maximum rotation angle is 90 degree.
8. Place unit into REV X1 mode and confirm the CTL output level is become more than 75% on play mode. Confirm the tape pass limit become lower limit at T3 post and the tape does not have curl at T3 and T4 post.
9. However out of specification, adjust T4 post height follow the Post Height Pre-adjustment procedure.

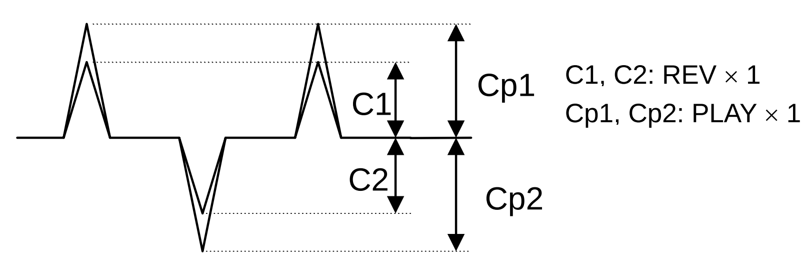
T4 Nut adjustment direction

Direction of adjustment nut of T4 post	CTL level on REV mode	Lower limit at T3 post On REV mode
Tighten direction	Increase	Tape touch to strong
Loosen direction	Decrease	Tape touch to weak

Post Limit

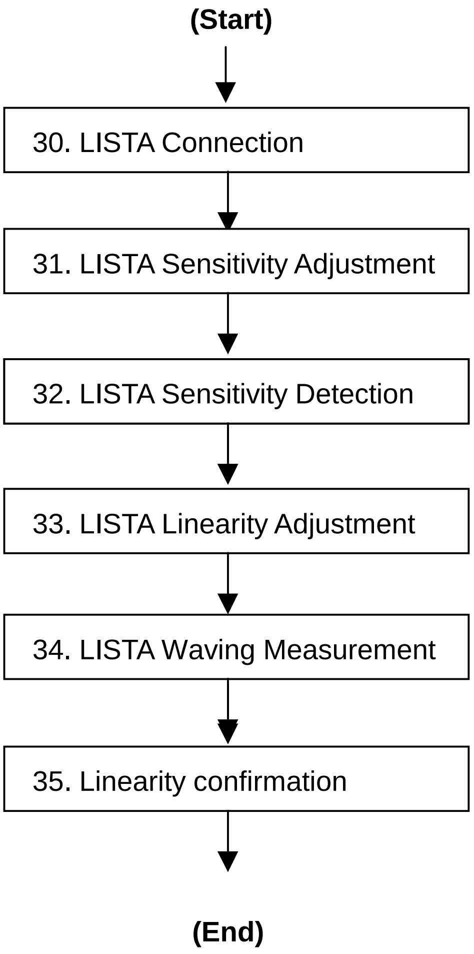
Post Name	Tape limit					
	A	B	C	D	E	F
T3 Post	×	×	○	×	×	×
T4 Post	○	○	○	×	×	×





C1, C2: REV × 1
Cp1, Cp2: PLAY × 1

Linearity Adjustment Flowchart


(Start)
30. LISTA Connection
31. LISTA Sensitivity Adjustment
32. LISTA Sensitivity Detection
33. LISTA Linearity Adjustment
34. LISTA Waving Measurement
35. Linearity confirmation
(End)

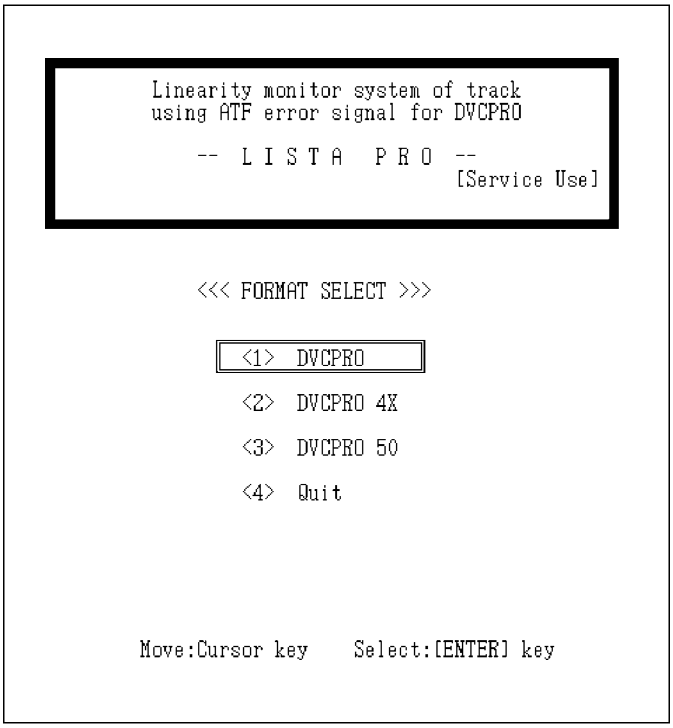
30. LISTA Connection and Boot Up

TEST POINT	TP115 : ATF ERR (SERVO Board) TP113 : R/H HSW (SERVO Board) TG300 : GND (SERVO Board)
M.EQ	P/C (AD Board should be installed), Oscilloscope
TAPE	NTSC : VFM3581KL, PAL : VFM3681KL
TOOL	VFK1481 (LISTA Software), VFK1186 (LISTA Cable)

1. Connect the LISTA Cable to A/D board on PC.
2. Connect the Clips of LISTA Cable to test point on Servo Board as follow as below.
   - ① ATF : TP115
   - ② HSW : TP113
   - ③ GND : TG300
3. Boot up the LISTA software on DOS mode.

★ Install and Boot up.
All files on the floopy disk (VFK1481) copy to created directly on PC (i.e. C:¥LISTA).
Type “LISTA” and press ENTER Key, then boot up LISTA software.

4. Select the item “DVC PRO” then “AJ-D200” for selected model on the menu.
5. After selected model, appeared alignment tape data on the screen for select the Serial number on the alignment tape. But if LISTA software have not resisted data of alignment tape, press the ESC key, then main menu is display on the screen. And select item “<4> Alignment Tape” for entry the data on the attachment sheet, which is enclosed of alignment tape.



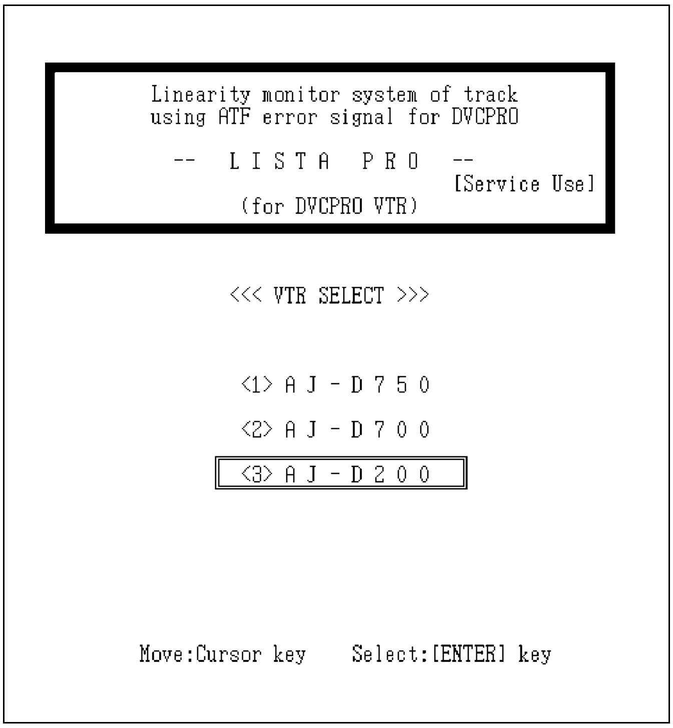
Linearity monitor system of track
using ATF error signal for DVCPRO

-- LISTA PRO --
[Service Use]

<<< FORMAT SELECT >>>

<1> DVCPRO
<2> DVCPRO 4X
<3> DVCPRO 50
<4> Quit

Move:Cursor key Select:[ENTER] key



Linearity monitor system of track
using ATF error signal for DVCPRO

-- LISTA PRO --
[Service Use]
(for DVCPRO VTR)

<<< VTR SELECT >>>

<1> AJ-D750
<2> AJ-D700
<3> AJ-D200

Move:Cursor key Select:[ENTER] key

How to Entry the Attachment Data of Alignment Tape

1. Select the item “<4> Alignment Tape” on the main menu to the LISTA software.
2. Select the item “<2> ENTRY” on the alignment tape menu.
3. After display the screen of “<<Alignment Tape Data Entry>>”, first input the Serial number follow the printed number on the tape label. And input the number “0” or “1” for select the PAL/NTSC. And after that for entry the tape type, in case of DVCPRO input to “0”, in case of DV input to “1”.
4. After select the Tape Type, the frame for input the DATA and CHECK SUM appeared on the screen, input the numerical value in numerical order on the data sheet, which are enclosed with alignment tape. If input the wrong number, appear the error message on the screen, then confirm that the data on the sheet.
5. After entry the data, select “<1> SELECT” on the Alignment Tape menu and select the serial number of the alignment tape.

<< Alignment Tape Data Entry >>   Serial No. 0596003 (NTSC)   18um

[1]	- 0.1
[2]	0.1
[3]	0.0
[4]	0.2
[5]	0.6
[6]	0.5
[7]	0.7
[8]	0.9
[9]	1.0
[10]	0.8

[11]	0.7
[12]	1.0
[13]	0.7
[14]	0.5
[15]	0.2
[16]	- 0.5
[17]	- 0.3
[18]	- 0.3
[19]	- 0.1
[20]	- 0.6

[21]	- 0.4
[22]	- 0.2
[23]	- 0.7
[24]	- 0.6
[25]	- 0.7
[26]	- 0.3
[27]	- 0.4
[28]	- 0.4
[29]	- 0.6
[30]	- 0.3

[31]	- 0.4
[32]	- 0.6
[33]	- 0.3
[34]	- 0.2
[35]	- 0.1
[36]	- 0.3
[37]	- 0.1

[CS]	- 0.6

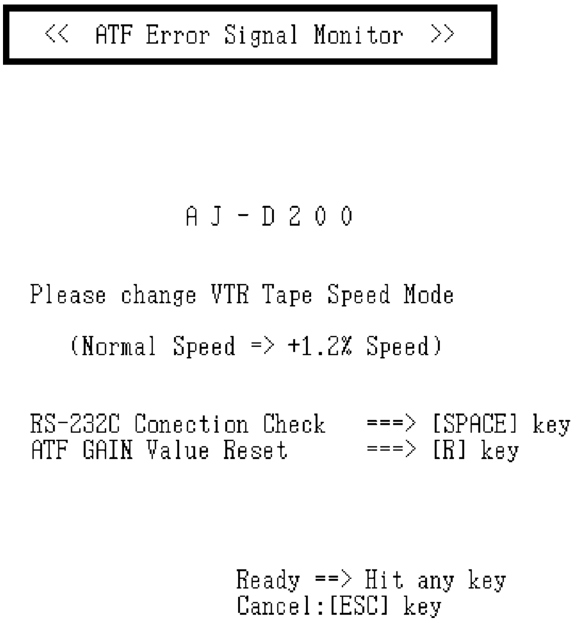
31. LISTA Sensitivity Adjustment

SPEC.	Sensitivity : 100 ± 10 (mV/µm)
MODE	PLAY
TEST POINT	TP115 : ATF ERR (SERVO Board) TP113 : HSW (SERVO Board) TG300 : GND (SERVO Board)
ADJUSTMENT	EVR (ATF Gain) : refer to below sentence about how to adjustment
TAPE	NTSC : VFM3581KL, PAL : VFM3681KL

1. Set up the EVR tool according to Connection figure at the beginning of Electrical Adjustments.
2. Confirm that the power is turned off and make a short-circuit between **TP902** and **TP116** to place the unit in +1.2% Playback mode.
3. After turn on Power and Playback an alignment tape.
4. Select the “**<6> ATF Error Signal Monitor**” on the main menu. And than press “**SPACE**” key for executes initializes.
5. Press the “**0 (zero)**” key for download the ATF GAIN DATA from the unit.
6. Press the “**ENTER**” key, sensitivity value as real time and waveform appears ont the screen as shown in figure.
7. Press the key in PC so that the sesitivity value which is described as **Sens, Value** is within specification.

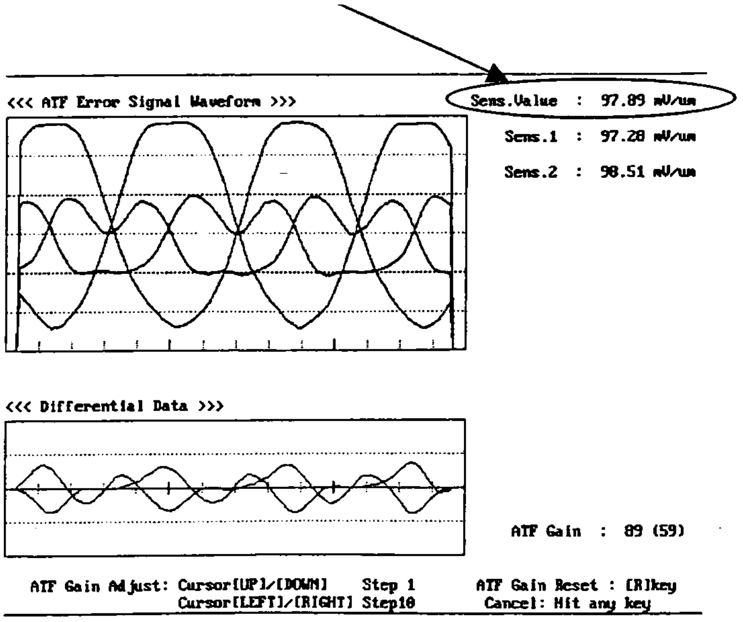
Note: Data is changed 10 steps by press [→] or [←] keys.
Data is changed 1 steps by press [↓] or [↑] keys.
After press arrow key, screen displays disappeared momentary during calculation on LISTA software.

8. After the adjustment, press ESC key to exit to the menu.



```
<<  ATF Error Signal Monitor  >>

A J - D 2 0 0

Please change VTR Tape Speed Mode

(Normal Speed => +1.2% Speed)

RS-232C Conection Check    ===> [SPACE] key
ATF GAIN Value Reset       ===> [R] key

Ready ==> Hit any key
Cancel:[ESC] key
```

Adjust this value in specification



```
<<< ATF Error Signal Waveform >>>          Sens.Value  :  97.89 mV/um
                                            Sens.1  :  97.28 mV/um
                                            Sens.2  :  98.51 mV/um

<<< Differential Data >>>
                                            ATF Gain  :  89 (59)

ATF Gain Adjust: Cursor[UP]/[DOWN]    Step 1     ATF Gain Reset : [R]key
                 Cursor[LEFT]/[RIGHT] Step10      Cancel: Hit any key
```

32. LISTA Sensitivity Detection

BOARD	Servo
SPEC.	Sensitivity : 100 ± 10(mV/μm)
TEST	TP115 : ATF Error (Servo Board) TP113 : HSW_R(Servo Board) TG300 : GND(Servo Board)
MODE	+1.2% Playback
TAPE	NTSC : VFM3582KL (LISTA) PAL : VFM3682KL (LISTA)
M.EQ	LISTA

1. Confirm that the power is turned off and make a short-circuit between TP902 and TP116 to place the unit in +1.2% Playback mode.
2. Playback an alignment tape.
3. Select <1> Sensitivity Measurement menu and start the sensitivity detection.
4. Confirm that the sensitivity value is within specification.
5. If out of specification, repeat the steps 3 and 4.
6. If still out of specification, make "LISTA Sensitivity Adjustment again.

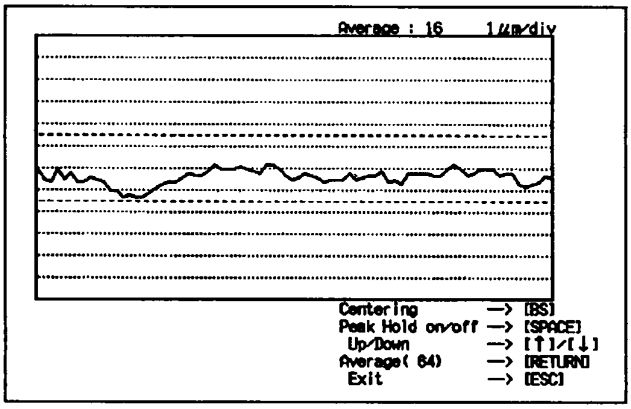
33. LISTA Linearity Adjustment

BOARD	Servo
SPEC.	Linearity: Less than 3μm
TEST	TP115 : ATF Error(Servo Board) TP113 : HSW_R(Servo Board) TG300 : GND(Servo Board)
ADJUST	S1, T1 Post Height
MODE	LISTA mode
TAPE	NTSC : VFM3582KL (LISTA) PAL : VFM3682KL (LISTA)
TOOL	VFK 1149
M.EQ	LISTA

1. Confirm that the power is turned off and make a short-circuit between TP902, TP116 and TP101 to place the unit in LISTA mode.
2. Playback an alignment tape.
3. Select <2> Linearity Measurement menu, and display the linearity.
4. Adjust the S1 post height and T1 post height so that the linearity is within specification.

Note.

1. Lower part of the monitor shows the lead.
2. Current linearity is red line.



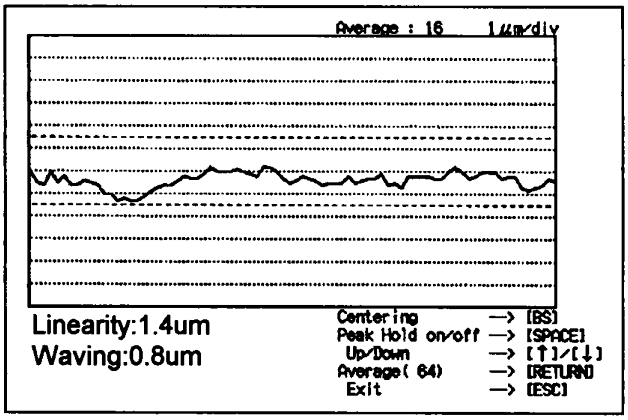
34. LISTA Waving Measurement

BOARD	Servo
SPEC.	Waving : Less than 1.5μm
TEST	TP115 : ATF Error (Servo Board) TP113 : HSW_R (Servo Board) TG300 : GND (Servo Board)
ADJUST	S1, T1 Post Height
MODE	LISTA mode
TAPE	NTSC : VFM3582KL(LISTA) PAL : VFM3682KL(LISTA)
TOOL	VFK1149
M.EQ	LISTA

1. Confirm that the power is turned off and make a short-circuit between TP902, TP116 and TP101 to place the unit in LISTA mode.
2. Playback an alignment tape.
3. Select <2>Linearity Measurement menu, and display the linearity.
4. After linearity is displayed, press the SPACE key to hold the peak (Peak-Hold) during 30 seconds.
5. After Peak-Hold, press the SHIFT key and key together to display the measurement value and confirm that the value is within specification.
6. After the adjustment, press ESC key to exit to the menu.

Note.

1. Confirm that waving value is almost the same from the entrance to the exit.
2. If out of specification because of wrong post limits, adjust the S1 and T1 posts again.



```
Average : 16    1μm/div

Linearity:1.4um
Waving:0.8um

Centering          —> [BS]
Peak Hold on/off   —> [SPACE]
 Up/Down           —> [↑]/[↓]
Average( 64)       —> [RETURN]
 Exit              —> [ESC]
```

35. Linearity Confirmation

SPEC.	V1/Vmax, V2/Vmax, V3/Vmax ≥ 0.8
TEST	TP500 (VTR MAIN Board)
MODE	PLAY (ATF)
TAPE	Blank Tape
TOOL	VFK1149
M.EQ	Oscilloscope

1. Record the color bar signal.
2. Play back the recorded portion and confirm that the envelope output is within specification.